

CELEBRATING NATURE-CULTURE RELATIONSHIPS

ASSESSING AND DOCUMENTING THE SOCIO-CULTURAL ANGLES OF HUMAN - BAT INTERACTIONS IN TAMIL NADU

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ABSTRACT

Over the years, bats and humans have shared various relationships, often influenced by cultural, societal, and ecological factors. People's perceptions of bats have been diverse, ranging from fear and superstition to admiration and reverence. In this study, we aimed to explore these dynamics by documenting interactions between humans and bats in different settings such as temples, urban areas, crop fields, and sacred groves. Through this research, we sought to uncover stories and traditions that illustrate the interconnectedness of humans and bats, with a focus on how these interactions contribute to bat conservation from a socio-cultural perspective. We delved into the roots of literature, art, and tradition that have either directly or indirectly protected bats through people's actions. Furthermore, our study uncovered narratives of gods and worship associated with bats, highlighting a unique research prospect in understanding the cultural significance of these creatures.

BACKGROUND

The relationship between humans and the natural world is deeply intertwined. Throughout history, humans have relied on nature for resources, inspiration, and sustenance. Our cultures, traditions, and even our languages are often deeply rooted in our interactions with the natural world. Consequently, it becomes imperative to recognise the significance of communities in the realm of conservation science and restoration. It is within our immediate environments that we scrutinise and comprehend nature and its dynamics. In this context, community-based conservation becomes part of a comprehensive, pluralistic strategy for biodiversity protection, emphasising governance from the ground up (Fikret Berkes, 2007). Understanding this complex interdependence requires considering not only the practical aspects of our relationship with nature but also the cultural, philosophical, and ethical dimensions.

People's perceptions and attitudes toward wildlife are influenced by various social factors, including cultural norms & beliefs. For example, the Sunderbans' unique ecosystem, home to Bengal tigers and saltwater crocodiles, influences local communities whose livelihoods depend on it. Rich folklore and mythology, featuring the forest goddess Bon Bibi and Dakkhin Rai as tiger representatives, contribute to shaping cultural attitudes towards the species in the Sundarbans.

Human-wildlife conflicts can also mirror social conflicts, with attitudes towards species fluctuating more with societal changes than actual wildlife damage rates. For example, in Tanzania, conflict with hyenas is intensified by suspicions that certain ethnic groups bewitch and train them to kill livestock. In Mozambique, the belief in sorcery leading to "spirit lions" contributes to lion killings. Such beliefs are found across cultures, involving various species, and recognising and addressing underlying social tensions is crucial for effective conflict mitigation (Dickman, 2010).

This study delves into the interactions between bats and humans, unravelling socio-cultural dimensions that extend beyond the confines of a strictly biological or scientific framework by exploring potential relationships that tell stories of how humans and bats have coexisted in spaces that are habitats to both.

BATS IN NATURAL HISTORY, CULTURE AND ART FORMS - A GLOBAL PERSPECTIVE

Throughout history, animals have been culturally categorised as either "good" or "evil," influencing conservation attitudes. This dichotomy can lead to biased perceptions, where "evil" animals may be considered less deserving of conservation (Low et al., 2021). Bats are no strangers to such polarising interpretations, although often associated with evil and chiroptophobia—an irrational fear rooted in Western cultural links to devils and witchcraft dating back to the fourteenth century. In India, there are examples otherwise.

In various regions of India, bats are revered and integrated into religious practices. In Madurai, worshippers of the God Muni consider the Indian flying fox (*Pteropus giganteus*) sacred and protect bat colonies to avoid divine retribution, even consuming dead bats after prayers (*Marimuthu, 1988*). In Pudukkottai, devotees of the goddess Kali worship these bats in sacred groves as protective guardians. In Bihar, followers of the goddess Laxmi believe bats bring wealth. There's even a bat temple in Assam, hosting festivals since 2001 (Low et al., 2021).

In Kundapura, Udupi, bats are seen as divine for their ability to predict floods, with residents observing them near a temple, as their behaviour signals an increase in water levels in the Kubja river, attracting devotees. This natural phenomenon attracts devotees, emphasising the cultural importance of bats' behaviour in predicting the annual flood event. These examples highlight the cultural significance and reverence for bats in various Indian communities.

A holy abode, a dark home

Bats have adapted to temple habitats over evolutionary history, primarily driven by the quest for suitable roosting sites that offer darkness. Temples often provide an ideal environment for bats due to their unique architectural features. In "Bats of the Indian Subcontinent" (1997), Bates and Harrison highlight that many fruit-eating and insectivorous bats in tropical Asia commonly roost in anthropogenic structures, particularly temples. Unlike other human-made structures, temples, with their long existence, offer numerous dark, musty, and disused corners. The high ceilings and stone walls of temples provide a damp and cool environment, making them ideal roosting places for bats. However in recent times, bats, particularly in temple structures, face threats due to modernisation and renovation activities. Between 2012 and 2017, a study in Tenkasi, Tirunelveli, and Thoothukudi districts revealed that out of 58 surveyed temples, 47 housed bats, with

estimates ranging from 2,922 to 5,116 bats. Various species, including Schneider's leaf-nosed bat and the lesser mouse-tailed bat, were identified. While some bats temporarily relocate during disturbances, intense renovation can lead to their complete abandonment of the temple. Examples include the abandonment of large colonies of Leschenault's rosettes in Nanguneri temple, Veeravanallur Bhoominathar temple, and near the Brahmadesam temple over the past nine years. (T. Ganesh, A. Saravanan, and M. Mathivanan).

A farmer's blessing

Bats, described as 'birds of the night' by Rajesh Puttaswamaiah of the Bat Conservation Trust of India, are vital for seed dispersal and pest control, contributing to increased agricultural yields. Bats' role in pollination is evident in co-evolutionary relationships with plants like the banana, which has nocturnal flowering and relies on bats for seed dispersal. In mango orchards, bats, particularly fruit bats, enhance cross-pollination, leading to increased yields and improved germination rates of bat-processed seeds.

The trio of mango, banana, and jackfruit, known as *mukkani*, holds cultural significance in Tamil Nadu, especially during the traditional New Year celebrations. Found in the Western Ghats and widely grown in Kerala and Tamil Nadu, bats aid in the propagation of jackfruit trees by acting as pest controllers, safeguarding them from shoot borers and bark-eating caterpillars. For over 10,000 years, bats have contributed to maintaining agricultural systems without acknowledgement, highlighting the socio-cultural angle of this enduring partnership (Akhila Vijayaraghavan, 2020).

Additionally, exploring a unique report in Karnataka, in a village near Uppinangady, Karnataka, bats have become an unexpected source of income for locals due to their habit of feeding on fruit trees. Thousands of bats roost near a temple, causing nuts and geru seeds to fall to the ground. Villagers collect and sell these nuts and seeds, earning thousands of rupees daily. This unique relationship between bats and humans highlights the potential of researching nature-culture relationships.

About bat songs

An interesting insight is how bats are not only socially and ecologically interconnected to humans but have inspired literature and folktales over the years in India. Bats are used as allegories to denote romantic or parental love in the poetry of Tamil Sangam literature in India (Sieradzki, Mikkola, & Heimo, 2022). The connection between bats and the cultural practices in Tamil Nadu, specifically the tradition of consuming *mukkani* (a combination of banana, mango, and jackfruit) during the celebration of the traditional New Year,

is also highlighted. This cultural practice is deeply rooted in the region's heritage, with Sangam literature providing vivid and rapturous descriptions of the significance of these fruits during the transitional period between spring and summer. The combination of these fruits carries symbolic meanings and serves as a ritual that connects individuals with their cultural roots, emphasising the interplay between cultural practices, biodiversity, and ecological awareness.

The release of Cho Dharman's novel "Vavval Desam" (The World of Bats) in 2022 sparked significant interest within Tamil literary circles due to its eerie portrayal of bats. The novel delves into the peculiar characteristics of bats, emphasising their unique behaviours, such as hanging upside down, nocturnal roaming, and preference for abandoned places. Cho Dharman, a Sahitya Akademi-winning novelist, explained that he chose bats as a symbol to capture their contradictory nature. The novel explores the symbolic significance of bats and likely intertwines their characteristics with broader themes.

Research by [Project Pteropus-Rimba](#) has uncovered a treasure trove of positive bat symbolism in numerous cultures across the [Asia-Pacific region](#). In this part of the world, our ancestors traditionally revered and celebrated bats, recognising how amazing and inspirational these animals really are. An [illustration](#) that reviews the usage of bats in a cultural or celebratory form. The art forms inspired by bats are not limited to songs or folklore but also include a number of old paintings and even records like [Bats in the Temple](#). Artists have often depicted bats in naturalistic illustrations, capturing their unique anatomy, flight patterns, and behaviours. The incorporation of bats into art reflects the fascination and cultural significance these creatures hold in different societies.

STUDY SITES

The study sites include parts of Karnataka and Tamil Nadu. The study was initially started in urban spaces of Bengaluru that include the Bull Temple area, Sankey tank area, and Aranya Bhavan, which had direct references from old reports and literature that pointed to the presence of bats in these areas. Another important site was the Lepakshi temple which also has available data on bats present inside the temple space.

In Kundapura, an underground cave that is a place of worship also has a good population of bats. But primarily the data was collected from Tamil Nadu.

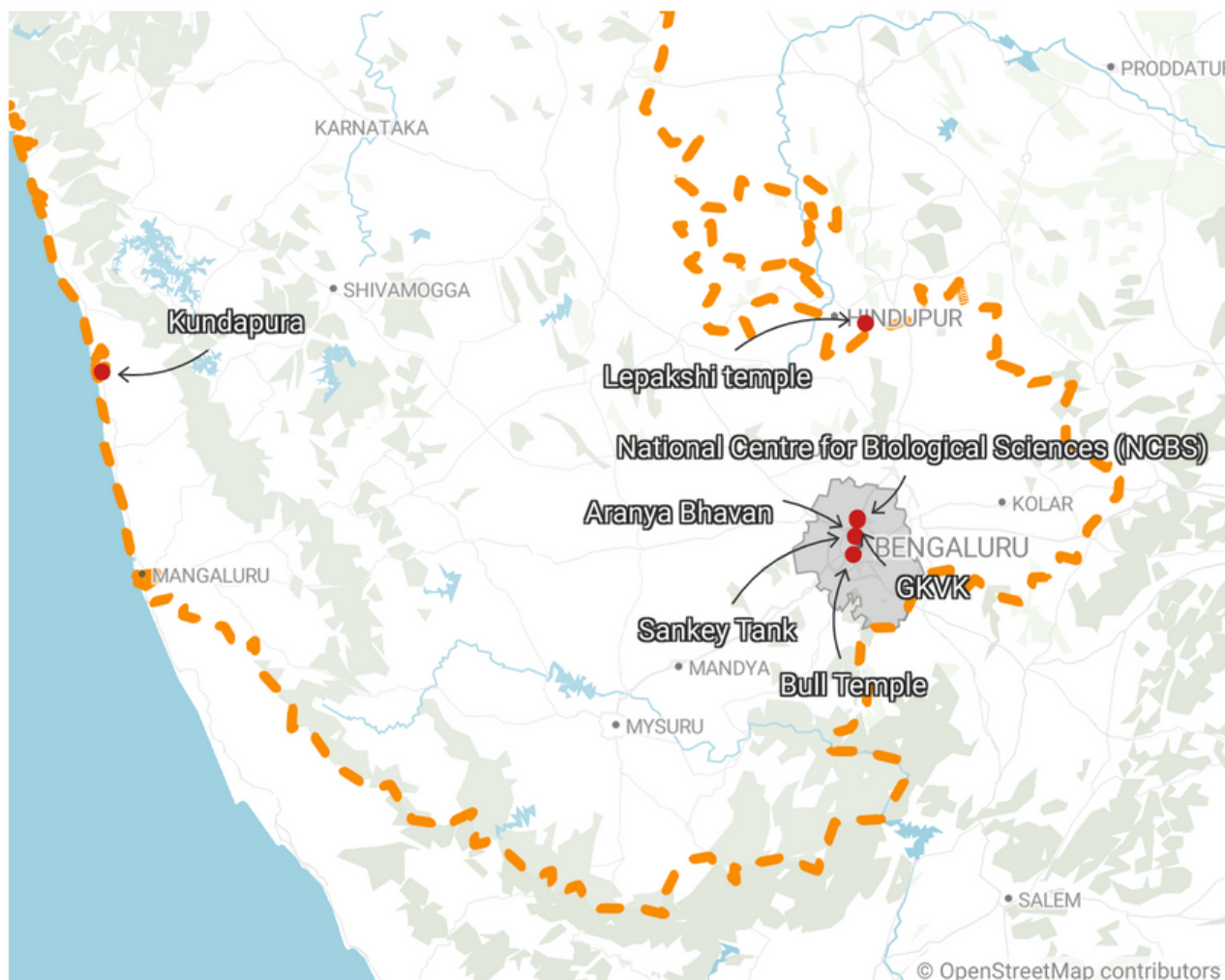


Figure 1: Field sites in Karnataka

In Tamil Nadu, the areas were primarily temples in Kallidaikurichi (Ambasamudram), Thiruvaidaimarudur temple/ Bird Sanctuary area, Gopalsamudram, Krishnapuram temple, Srivaikuntam temple, Murappanadu temple & Murappanadu sacred grove (Inthu Marathu Sudalai temple) area.

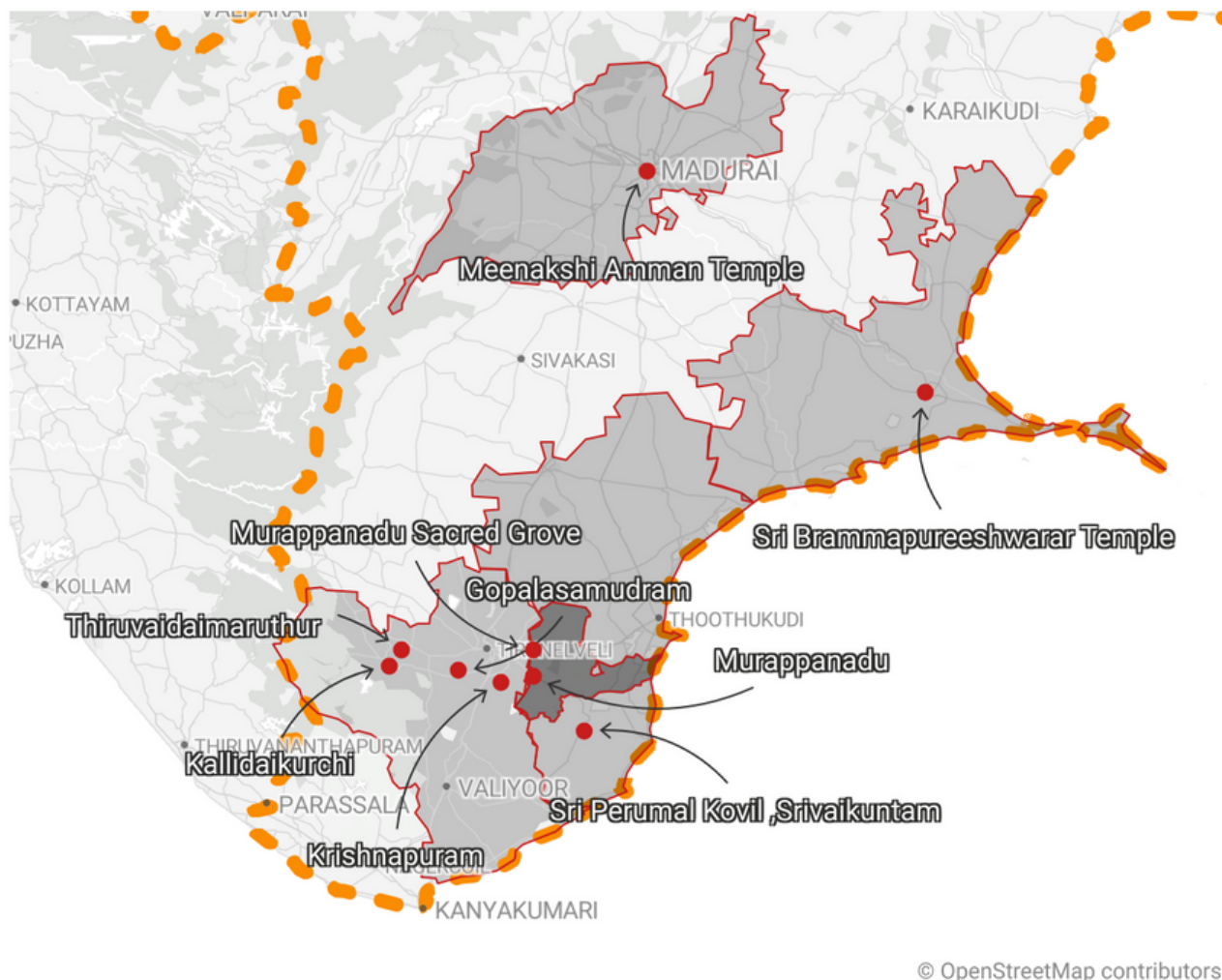


Figure 2: Field sites in Tamil Nadu

METHODS

PERIOD OF WORK

This study was conducted between October 2023 to March 2024, starting off with field surveys across the sites and then conducting final interviews in the relevant regions along with documentation. It is noteworthy that the temple sites could only be visited during morning hours or after 5 pm in Tamil Nadu owing to the temple norms.

INTERACTIONS IN THE FORM OF INTERVIEWS AND GROUP DISCUSSIONS

After delving into the existing literature and outlining the procedures of our work, the next step involved crafting a comprehensive questionnaire. This Questionnaire aimed to encapsulate various points that included the perceptions of the interviewees about bats and the presence of bats around them; the timing of bat sightings; if they have observed bats in any specific pattern and the type of species they have observed. The questions were subject to change based on the field sites in the case of temples it was important to ask if the infrastructure has changed over the years and affected the bat population while for the bats outside the temple premises, it was important to estimate the population and the tree species they preferred to roost on. The questions were pertinent to change as per the target audience along with the field site.

Once the questionnaire was prepared, it was discussed with the collaborators to finalise. The interviewed groups were priests, temple staff/caretakers, farmers, local residents, devotees, visitors and researchers. The majority of interviewees were temple workers as the most number of sites covered were temple areas based on the availability of people.

As this work involved interviewing people, a human research ethics permit was approved by WCS-India's Human Research Ethics Committee (HREC) and consent was taken before recording the interviews. This ensured that care was taken to protect identities amongst target audiences and even information that they preferred to not share in public or reportable form.

Tamil and Kannada were the major languages used for the interactions in Tamil Nadu and Karnataka respectively and were transcribed later to English.



Figure 3: Interview at Manenthiappar Temple.

DOCUMENTATION THROUGH PHOTOGRAPHS AND VIDEOS

The documentation primarily focused on the temple spaces where bats and humans coexist, highlighting the relationship between people and these creatures. The documentation included a collection of excerpts detailing how local communities use/ depend on the temples for various reasons while sharing the space with bats. All audio/ video recordings were conducted with the full consent of the individuals involved, ensuring ethical practices throughout the documentation process. The documentation aimed to shed light on the intricate connection between humans, bats, and temple environments.

FINDINGS & OBSERVATIONS

Across the field sites, 31 semi-structured interviews and two group discussions were conducted with a diverse range of participants including locals, temple workers, farmers, and researchers as follows.

Interviewee	No.
Farmers	14
Temple staff (caretakers, cleaning staff, priests, devotees)	11
Researchers	2
Visitors	2
Farmer group discussion	2
Locals	2

BATS INSIDE TEMPLES

During our fieldwork in remote areas of Tamil Nadu, where ancient temples abound, we encountered a fascinating aspect of temple life: the presence of various species of bats such as the Indian flying fox (*Pteropus giganteus*), *Rousettus sp.*, *Megaderma lyra*, and *Hipposideros speoris*. These bats have made the darker corners of these temples their living spaces, often flying across the temple arena when necessary. Remarkably, within temple premises, especially those untouched by renovation work, the bats coexist without disturbance. This is especially true in the case of temples like Thiruvadurai Madam and Manenthiappar temples in Kallidaikurichi.

The most predominant bat species here are Indian flying foxes, these occupy spaces inside temples as well as outside on trees like mango, Ashoka, and guava.



Figure 4: Interview session with temple staff.

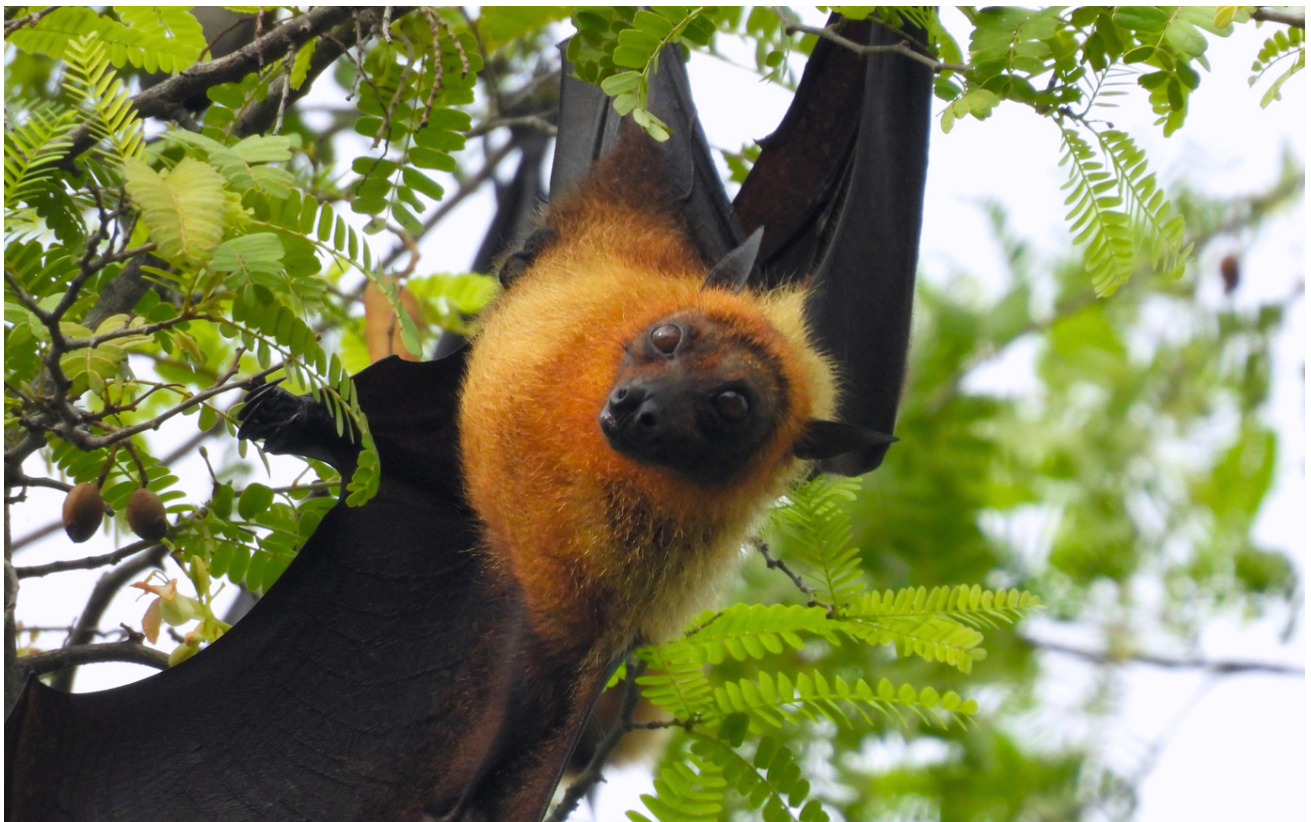


Figure 5: Indian flying fox on the grounds of the Manenthiappar Temple.

However, contrasting perspectives emerged during our interactions in other temples. A priest at the Srivaikundam temple voiced concerns about the nuisance caused by bat droppings in temples. Despite the general acceptance of bats among the local populace, the accumulation of faecal matter was viewed as problematic. Interestingly, some temples have found a pragmatic solution to this issue. They utilise the bat droppings for agricultural purposes, assigning separate staff to collect and store this organic matter for future use and this practice is not something new but has been prevalent for a long time.

One interviewee mentioned collecting bat droppings along with his father in his childhood days. This diversity of viewpoints underscores the complexity of the relationship between humans and bats in temple spaces.

While some perceive them as harmless inhabitants, others grapple with practical challenges posed by their presence. Nonetheless, the innovative use of bat droppings for agricultural enrichment demonstrates the intricate interplay between tradition, ecology and practicality in these sacred spaces.

In earlier times over the years, not just temple spaces but heritage sites like tombs, and sacred groves also have provided space for bats to survive as these are quaint, undisturbed structures especially where the bats live high up. Most places that have undergone renovation have lost bat populations over time.



Figure 6: Bats on the ceiling of a temple complex in Thiruvaduthurai.

BATS AND FRUITS - A FARMER'S CONTEXT

When asked about bats in crop fields, farmers interviewed in a group mentioned -

“Whenever we harvest, we notice bats flying across but we have never heard of bats living inside temples, we never go to the temples, we are not allowed inside, we belong to a lower caste.”

An interviewee mentions how bats play a crucial role in controlling insect populations, particularly pests that threaten crops. He explains that while many people associate bats with fruit-eating, they are also voracious consumers of insects. He emphasises the importance of bats in natural pest control, reducing the need for harmful pesticides in agriculture. An illustration - Fruit Bats Drawing by Cyril Jean depicts the relationship between bats and the fruits they eat.

Another interviewee highlighted the significance of bats' nocturnal activities in crop fields. He observed that bats are often seen flying across crop fields during the night, indicating their active role in maintaining the ecological balance in agricultural landscapes.



Figure 7: Interaction with Banana cultivation farmers

CONSERVING BATS AND BIRDS TOGETHER

In Thiruvidadaimarudur Bird Sanctuary, renowned for its diverse bird population, the common practice of using crackers is strictly prohibited in the area. This restriction also enforced in the Narumbunathar temple vicinity, inadvertently serves as a safeguard for the bats inhabiting the sanctuary. Indian flying foxes and different bird species coexist in the trees here.



Figure 8: Painted storks sighted in Thiruvidadaimarudur Bird Sanctuary.

BATS IN THE RELIGIOUS CAVES OF KUNDAPURA

In Kundapura, an underground cave serves as a unique sanctuary for bat species, coexisting alongside *puja* rituals conducted within its depths. Despite the cave's eerie darkness and occasional flooding during the rainy season, devotees flock to witness the *swayambhu* of Lord Vishnu and a man-made structure of Lakshmi within. The priest guiding visitors through the cave revealed that the bat population has remained stable over the years, underscoring the enduring presence of these creatures amidst religious practices. This relationship between humans and bats within the sacred cave adds a fascinating dimension to the spiritual significance of the site.



Figure 9: Entrance to the cave



Figure 10: A bat inside the cave.

A FIERCE GOD PROTECTS THE BATS IN THE SACRED GROVE OF MURAPPANADU

A distant group of trees in the middle of fields, a stone-carved God, and a group of 200 plus bats roost on the trees.

An interviewee shares that in the sacred grove of Inthu Marathu Sudalai temple, there exists a God, a protector of the area, who has kept people from even visiting the adjacent area, as it is believed to be an angry God. Even photography was prohibited to us.

An old story from the village suggests that a man who tried to hunt bats was killed by a retracting bullet from his gun. The villagers believe this was executed by the God, who for the longest time has tried to keep nature in this area safe and unexploited by humans.



Figure 11: Murappanadu Sacred Grove area

BATS IN THE CITY

In Karnataka, primary scouting trips were conducted in urban spaces like Bengaluru, where people observed bats flying around the city undisturbed, unnoticed by the public. Visits to areas like the Bull Temple and Sankey Tank, reportedly home to bat species within the city, prompted discussions on coexistence, envisioning a harmonious relationship where neither humans nor bats are disturbed. Bats were observed flying across water bodies like the Sankey tank area in the city of Bengaluru unhinged, uninterrupted in a city whose skies they have made their own.

Rajesh Puttaswamaiah says in an article that bats are indeed fascinating creatures and Bengaluru's diverse ecosystem provides ample opportunities for observing these unique mammals. Their nightly flights in search of food offer a spectacle for those who take the time to observe them. The presence of bats in urban areas like Bengaluru also underscores the importance of preserving green spaces and maintaining biodiversity within cities. Studying bats not only offers insights into their unique behaviour but also contributes to our understanding of broader urban ecological dynamics.

SOME MEMORIES OF BATS

Many interviewees fondly recalled childhood memories. Some reminisce about playing amidst the bats as they took flight during the evening hours. This personal connection is intriguing, as it reflects how these individuals have grown up alongside these creatures, becoming familiar with their behaviours and presence.

Furthermore, they note changes in bat populations over the years, indicating a keen awareness of environmental shifts and emphasising the significance of long-term observation of local wildlife.



Figure 12: A children's book illustration on bats

An interviewee who took a deep interest in understanding our research context was someone who was fascinated by bat stories. He said he thinks bats are very intelligent creatures as they can manage to keep track of time without having to use clocks.

This interest in the contexts of bats is evidence for bats being an integral observation in the lives in this region. The connection between natural occurrences and people's mindsets forms an integral connection that transforms into art, literature and often folklore that percolate across generations.

Many children's illustrated literature like Bat Nursery Kids Illustration: Behance include bats in their rhymes and such mediums are essential for knowledge impartation through storytelling.

PROSPECTS

The study conducted in Tamil Nadu explores the interactions between bats and humans, particularly focusing on temples as unique research sites. Through active fieldwork, various angles emerged, highlighting the significance of understanding these interactions. The research not only delves into the dynamics of bat colonies within temple spaces but also sheds light on broader anthropogenic interactions. This study serves as a foundation for future research in this intriguing area, paving the way for deeper exploration beyond mere colony observations.

CHALLENGES

Navigating the complexities of human-bat interactions presented both challenges and limitations for this research endeavour. As a communicator with a scientific background, bridging the gap between academic research and local communities required delicate navigation and rapport-building skills. Explaining the theme of the study in a way that resonated with people and fostering trust and cooperation were essential.

One notable challenge was the difficulty in engaging women in the study, which resulted in a significant gap in perspectives and information. Furthermore, the inherent limitations of field research, such as the inability to document every observation or interaction, pose constraints on the depth and breadth of the study. Balancing the desire to capture all relevant information with ethical considerations, such as respecting the privacy and autonomy of individuals, is crucial in maintaining the integrity and validity of the research process.

CONCLUSION

This study presents a unique perspective by delving into the often-overlooked interactions between humans and bats, shedding light on the intricate relationships that exist in shared habitats. Beyond merely documenting these interactions, it seeks to understand the historical context of these relationships and how perceptions have evolved over time.

Bats, having coexisted with humans for centuries, have adapted to habitats that are inhabited and shaped by human activity. Evaluating the dynamics of human-bat relationships within this context is crucial for understanding the coexistence of these two species in common spaces such as temples and fields. Examining these relationships can reveal the boundaries and limitations of local knowledge and practices.

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