

Threats, Perceptions, and Conservation Challenges of Indian Pangolins in Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Manis crassicaudata, the Indian pangolin, is one of the most heavily trafficked animals in the world. Their scales are the most sought-after commodity in the illegal wildlife trade market. This research examined the species' current population status, threats, and conservation problems in five places of Khyber Pakhtunkhwa in Pakistan, these places are Peshawar, Azakhel, Charsadda, Nizampur and Lalakalay. Information was gathered through direct observations, camera traps, and interviews with locals and wildlife officers; besides this, signs of burrows and fecal were also used as sources. There is a steep decline in the population of this species in all the areas surveyed. Among the survey sites, Azakhel is reported to have a higher density of the species. Poaching is among the highest of the threats that have been enumerated, as well as illegal trade and the exploitation of animals as a source of traditional medicine. The data on public perception has driven the point home that the awareness level of the conservation of the species has very low enthusiasm. The outcome of conservation awareness in the region revealed the species' situation and highlighted the main issues that must be dealt with as well as the urgency for the formulation of practical conservation actions. These actions should include the educating of the populace, the strengthening of law enforcement, and the establishment of community-based surveillance programs as the primary pillars of the protection of the Indian pangolin population in the area.

Keywords: Indian pangolin, poaching, trafficking, public awareness, conservation strategies

INTRODUCTION

Anthropogenic activities lead to the major destructions of environment and wildlife, which results in the habitat loss and species to get extinct. The Indian pangolin, *Manis crassicaudata*, is one of these species, which faced tremendous population decline because of the illegal practices. There are eight species in total, Indian Pangolin is the only species that occurs in Pakistan (Mahmood et al., 2019; Raymakers, 2006; IUCN, 2020).

The Indian pangolin is an insectivore primarily feed on ants and termites, using its long, sticky tongue to snap its prey (Mahmood et al., 2016). They are sexually dimorphic with males generally are bigger than females, and has a low reproductive rate, gives birth to only one offspring. Twins in rare case have also been recorded in captivity. The gestation period is of 65–70 days (Hua et al., 2015). Morphometric measurements show variations in color and size among Indian Pangolin (Algawatta et al., 2020). Despite being found in Pakistan, India, Bangladesh, Sri Lanka, and Nepal, this species is increasingly at risk as poaching continues to endanger its survival for its keratinous scales, which are used in traditional Chinese medicines and as luxurious food, most notably in China and Vietnam (Mahmood et al., 2012; Challender et al., 2015).

Besides poaching, agricultural growth, urbanization, and ruthless killing due to fear is continuously threatening the Indian Pangolin (Singh et al., 2017; Mahar, 2000). The value of research emphasized the significance of documenting the pangolins behavior, feeding habit and the threats which they face (Karawita et al., 2018, 2020; Perera & Karawita, 2020; Perera et al., 2017; Perera et al., 2021); Information gaps still exist on their conservation status and distribution in less researched areas (Mahmood et al., 2020). Additionally, an increasing focus is being given to local perception as it can shape the conservation management and outcomes (Fopa et al., 2020; Ingram et al., 2019).

Considering these challenges, the research aims to address the population trends, local knowledge

about the specie, threats and conservational management in five selected sites within Khyber Pakhtunkhwa, Pakistan. The findings provide an insight to enhance regional understanding and to fill the knowledge gap.

MATERIALS AND METHODS

Study Area

The research was conducted across five sites in Khyber Pakhtunkhwa (KPK), Pakistan: Peshawar, Lalakalay, Charsadda, Azakhel, and Nizampur. These areas were picked to ensure coverage of habitat diversity, human-wildlife conflict and sightings of Indian Pangolin. To avoid the bias site selection was designed as such that covers both the rural and semi urban regions. (Figure 1; Table 1).

Field Surveys and Direct Observations

Due to nocturnal behavior of Pangolin, field surveys were done in the morning and evening. The direct observations are as follows:

- Spotting footprints embedded in soil.
- Detecting feeding activity near mounds of ants and termites.
- Recognizing burrow sites through physical features and recent presence of pangolin.
- Tracking pangolin cases confiscated by Wildlife department.
- GPS- enabled mobile devices were logged to record the location of burrows. Images and documentations were utilized to ensure the validation.

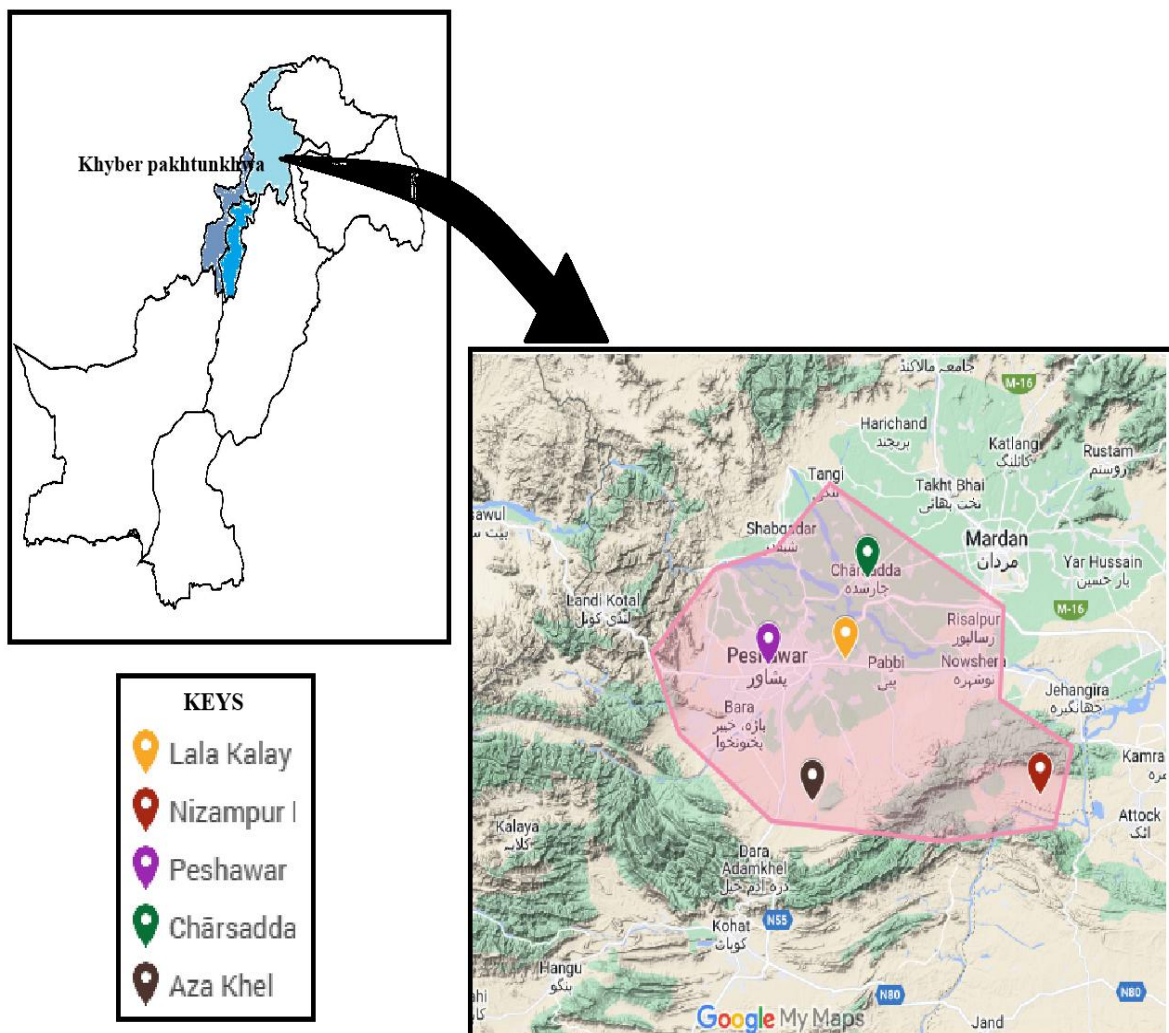


Figure 1: Study area of Indian Pangolins in Khyber Pakhtunkhwa, Pakistan.

Table 1. Geographic and ecological data of Indian pangolin sites in Peshawar.

Age group of respondents	No. of animals observed	Percentage
10 to 20	5	11.6%
20 to 30	10	23.3%
30 to 40	15	34.8%
40 to 50	7	16.3%
50 to 60	6	14%
Total	43	

Indirect Methods and Interviews

Indirect data collection was considered by interviewing 43 individuals including nomads, farmers, locals and wildlife officials, because pangolins are hard to spot. The sample size was randomly selected based on possibility and previous research which was done in rural regions of Pakistan. For the identification of pangolin photographs were shown to the locals. The interview comprised on various questions which focused on:

- Occurrence rate and where pangolins have been observed.
- Reported threats such as poaching and fear-based killing.
- Local myths and cultural beliefs.
- Public awareness related to laws and regulations which preserve wildlife.
- Semi-structured interviews were conducted to ensure balancing consistency and comprehensive insights.

Threat Identification

Although no active hunting was directly recorded, data about threats were observed by: Local statements.

- Confiscated records were obtained from wildlife departments.
- Misconceptions and Pangolins unique body form led to fear-based killing.
- Due to urbanization and population expansion resulted in habitat loss.
- Lack of awareness of specie protected laws, among locals was noticed.

Public Perception and Awareness

Responses revealed widespread false understanding among individuals:

- Pangolins were considered as dangerous creatures prompted locals to kill them.
- Some of the respondents were aware of the medicinal properties of pangolin scales.
- Awareness about protected laws or specie is endangered was not observed among locals.
- Participants statements were gathered to highlight their understanding.

Data Analysis

Quantitative data was organized using Microsoft Excel. With statistical tools (e.g., percentages, frequency distributions) to outline main trends. Chi-square test was not applicable due to small and random sample size. Though awareness and knowledge were addressed qualitatively.

Ethical Compliance

The study claims that no animals were harmed or disturbed in their natural habitat. All the data collected is in accordance with ethical guidelines and with the concern of participants.

RESULTS

Habitat Association

Across all selected sites of KPK, Indian pangolin was detected in both human occupied and its natural habitat. Its distribution was linked to habitat features, human activity and land management.

Natural Habitats:

As shown in figure 2, a confiscated pangolin by wildlife department in Lalakalay illustrating their conservational enforcement. Depicted in figure 3A a pangolin is seen within semi-arid environment intact with native vegetation. while Figure 3B display the Pangolins' preferred habitat, indicated by thick underbrush, and limited human activity.

Human-Occupied Areas:

even though Pangolins are extremely shy animals they were still recorded in human-occupied regions. Figure 4 (A-C) shows specie occurrence fields, around human dwellings, and in semi-urban areas which may reflect a possible risk of conflict with humans.

Presence across Study Sites

Table 1 outlines the geographical and habitat-related details of study sites. Both direct and indirect observations such as presence of burrows and records indicate an overview of specie distribution.

Lalakai: A confiscated pangolin was observed in captivity, by the authorities. No pangolin was found during the field survey, suggesting that urban expansion may have led to habitat loss.

Charsadda: One Pangolin was recorded by the Wildlife Department and was later released in Peshawar. No active burrows or direct sightings were noticed during the study, suggesting nocturnal habit and low pangolin density.

Nizampur: In this site two pangolins were documented suggesting as more active location. Dry plains and combination of vegetation offers suitable habitat.

Azakhel: this semi-arid habitat confirmed the pangolin direct sighting and evidence of its associated burrow. Due to low human activity and suitable shrubs likely supports occasional pangolin existence.

Peshawar City: A Pangolin was spotted at night-time which was then relocated to Peshawar Zoo. Wildlife Department records from 2020 reported three additional cases, indicating sporadic movement into the urban fringe.

These observations collectively suggest that pangolins persist across the region but are under increasing pressure from habitat disruption and human interference.

Threats to Pangolin Survival

Several threats were identified through field survey and interviews:

Habitat loss: Urbanization, agriculture expansion and construction has led to loss of habitat.

Human-wildlife conflict: Misunderstandings about pangolin often lead in killing the animal. For this purpose, they used different methods like stabbing the head with stones or sticks.

Environmental degradation: Burrowing behavior and feeding habit was also influenced by pollution and soil compaction.

Poaching: Direct evidence of poaching was not observed; however, confiscation cases and illegal hunting remains an occasional threat. The records were handed by wildlife department.

These threats appear to be driving an observable decline in Pangolin's population.

Public Perception and Awareness

Insights from local responses, Table 2 illustrates key gaps in awareness among them:

Demographics: The 30–40 age group represent the largest share of respondents with direct or indirect pangolin sightings (34.8%), followed by the 20–30 group (23.3%) and 10–20 group (11.6%).

Population trends: 86% of the respondents reported a decline in encountering the specie as shown in Table 2 which aligns with the observation of habitat disturbance.

Conservation Efforts and Recommendations

Wildlife Department has taken numerous measures, including confiscation of specie, relocating the pangolins to its natural habitat or safer area, charging fines and imprisoning the culprit. However, these efforts are not enough and lack long-term effectiveness. Unlike other species captive breeding of pangolins is proven unfeasible due to the specific feeding behavior and high sensitivity towards stress. Based on fieldwork and public engagement, conservational recommendations are as follows:

Habitat preservation: Safeguarding the natural habitats of Pangolins as they are totally dependent on the area for feeding and living.

Sanctuary establishment: Creating wildlife sanctuaries and implementing no hunting laws.

Public education: awareness programs should be conducted for educational institutions and among local communities. Sensitizing about the ecological importance of Pangolin.

Enforcement: Anti-poaching measures and strict laws must be enforced for this endangered species.

Efforts done during field work: Educational efforts were incorporated into field visits, and informal community sessions were held to dispel myths and encourage coexistence.

Table 2: Public Perceptions and Human–Pangolin Interactions in Study area.

Aspect	Response	Frequency	Percentage (%)
Population Trend Perception	Decreasing	37	86%
	Don't Know	6	14%
	Increasing	0	0%
Support for Pangolin Elimination	No	37	86%
	Yes	6	14%
Perceived Conflicts with Pangolins	Make holes in walls/human areas	19	44.20%

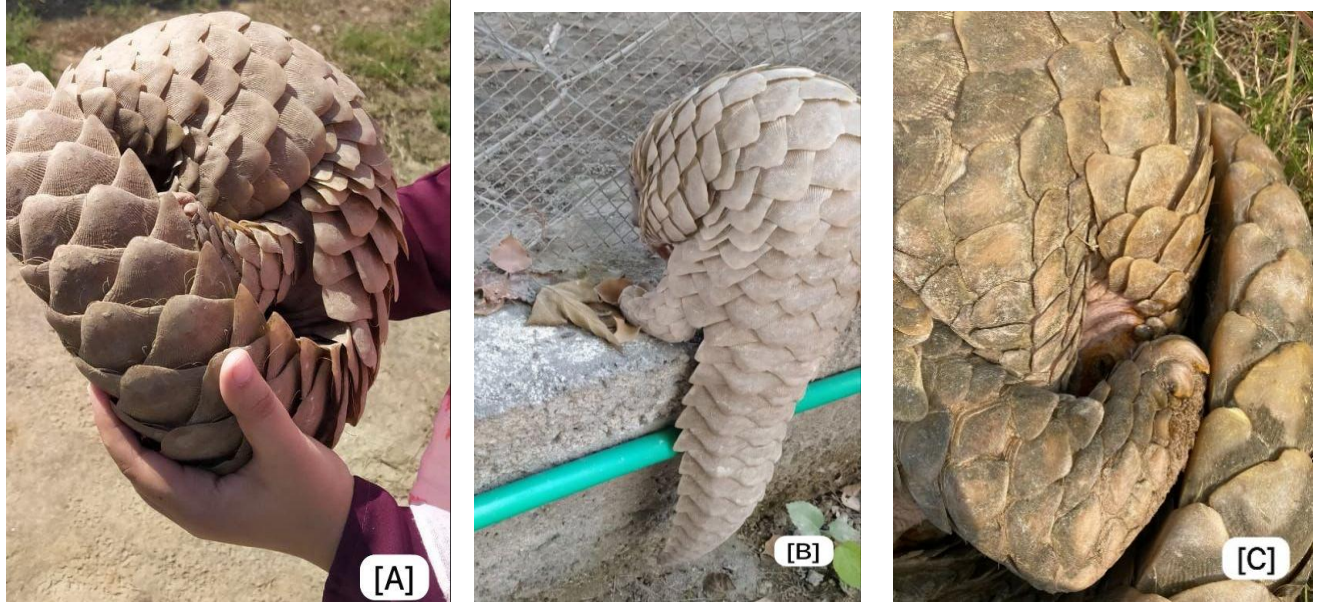


Figure 2: Photographs (A–C) of an Indian pangolin (*Manis crassicaudata*) confiscated by the Wildlife Department in Lalakalay.

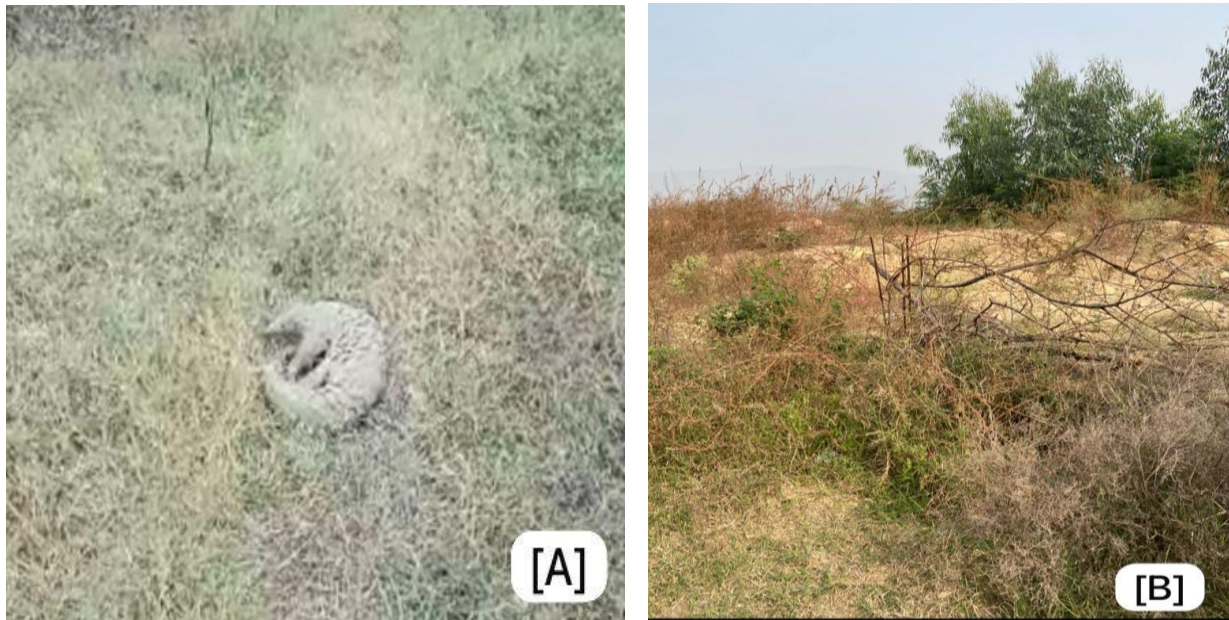


Figure 3: (A–B) Indian pangolin observed in a natural habitat; (B) typical undisturbed habitat preferred by the species.

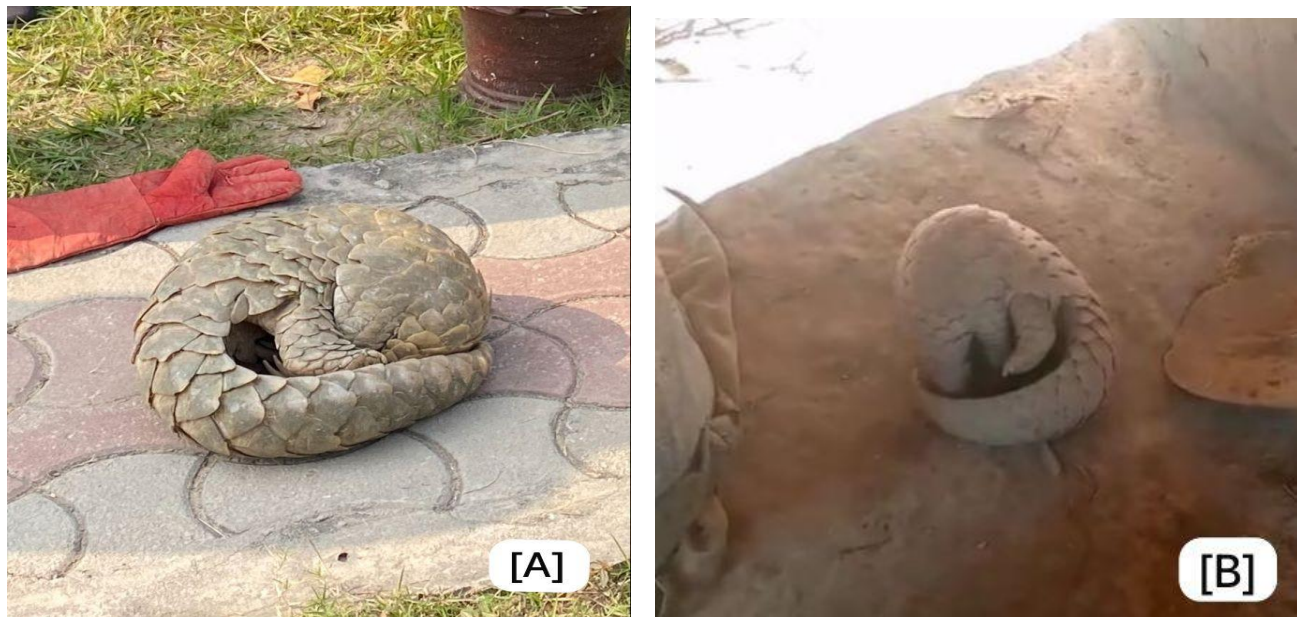


Figure 4: (A–B) Indian pangolins observed in human-impacted areas, including agricultural fields and settlements.

DISCUSSION

This research presents valuable insights into the distribution, challenges and public attitudes towards Indian Pangolin (*Manis crassicaudata*) in selected sites of Khyber Pakhtunkhwa, Pakistan. A noticeable drop was reported in burrow activity and sightings which is linked with inadequate enforcement, habitat deterioration and agricultural expansion (Akrim et al., 2017; Umar et al., 2020). Similar trends seen in South Asia, increasing rural and urban areas has led to shrink the ecological range of the pangolins and potential conflicts with humans (Karawita et al., 2018; Mahmood et al., 2019).

Despite pangolins were misunderstood or feared in past, most participants in the current study expressed opposition against killing. This suggests a potential for positive community collaboration and mindset. These findings are in line with (Challender et al., 2020) who emphasis on community-based conservation of lesser-known endangered species. The lack of public awareness regarding the pangolin's ecological importance, pest control, and it's legal protection status acts as a major barrier in its conservational efforts.

Therefore, effective outreach through educational institutions and community gatherings is necessary for dispelling myths and build support for its peaceful coexistence.

While efforts like the confiscation and releasing pangolin, serve only as a temporary relief, but do not address the systemic threats to pangolins. Attempts at captive breeding has proven ineffective due to its specific dietary needs, solitary behavior and stress sensitivity (Challender et al., 2024; Hua et al., 2015). To ensure sustainable conservation in situ methods must be implemented to protect the specie by safeguarding its natural habitats, setting up protected sanctuaries and intensifying legal actions against poaching and trafficking.

In this regard, reinforcing efforts on national level incorporate with international protection frameworks like CITES can strengthen the legal protections and support global conservation efforts, considering the transnational nature of wildlife crime around the globe it is essential to exchange the important information and robust monitoring (Raymakers, 2006; Heinrich et al., 2016; Challender et al., 2015).

To conserve the population of *Manis crassicaudata* in Pakistan, we must adopt a stronger holistic approach that includes awareness campaigns, habitat preservation, effective enforcement and community engagement. Further research is essential which will focus on tracking population trends and evaluate protection to enhance future wildlife management.

CONCLUSIONS

In a nutshell, the study underscores the endangered status of Indian Pangolin a critical need of conservational management to protect the Pangolins in KPK, Pakistan.

Population decline was recorded whereas habitat loss and threats further complicate the situation. The threats include poaching and ruthless killing due to fear. Although awareness among people was expanding it still was not sufficient enough and proper management and efforts are required.

Long-term solutions are required to cop up with the issue. Poor enforcement and constraints of captive

breeding highlight the urgency for sustainable conservation methods.

The research recommends key measurements including habitat protection, enforcing stricter laws and establishing wildlife sanctuaries (Protected areas).

Serving as foundational baseline about Indian pangolin status, risk factors, public perceptions, this study delivers an urging need of taking conservational initiatives.

Findings from this research may shape the future policy making decisions and strategic conservation for better coexistence between coexistence between Indian Pangolin and Local people.

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