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Understanding Conflict and Coexistence: A Study of Human–Leopard Interactions in Jhalana, Jaipur

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Abstract

Understanding human–leopard interactions in urban landscapes is crucial for developing sustainable conservation strategies, particularly in rapidly growing Indian cities where wildlife habitats are increasingly fragmented. Jhalana, located within the metropolitan boundaries of Jaipur, presents a unique case where a stable leopard population coexists with dense human settlements, offering valuable insights into the dynamics of conflict and coexistence. This study investigates the ecological patterns and social dimensions that shape human–leopard relationships in the Jhalana landscape. Using a mixed-methods approach combining field observations, secondary ecological data, GPS-based mapping, and community surveys, the research examines leopard movement patterns, habitat use, prey availability, and the spatial distribution of interaction zones. Simultaneously, it analyses community perceptions, fear levels, tolerance, cultural attitudes, and the influence of livelihood dependence—particularly livestock rearing and tourism-related activities—on coexistence outcomes. Findings reveal that leopards exhibit significant behavioural adaptability, using scrub corridors, rocky hillocks, and semi-natural urban patches to navigate the landscape while avoiding direct confrontation. Most interactions are non-threatening, though livestock depredation and fear-based concerns persist in fringe settlements. Tourism contributes positively by generating local employment and fostering conservation awareness, yet requires careful regulation to prevent ecological disturbance. The study highlights that long-term coexistence in Jhalana depends on integrating ecological insights, community engagement, and urban-sensitive management practices to ensure the wellbeing of both people and leopards.

Keywords: human–leopard conflict, urban wildlife, coexistence, Jhalana Jaipur, conservation management

Introduction

Human–leopard interactions in India represent one of the most complex dimensions of human–wildlife relationships, particularly as expanding urban landscapes increasingly overlap with the habitats of large carnivores. Jaipur's Jhalana Safari Park stands out as a

remarkable example where leopards have not only persisted but have established a stable population within a fully urbanised environment. Spread across approximately 24 square kilometres and encircled entirely by residential neighbourhoods, commercial zones, and busy road networks, Jhalana represents an ecological island where the survival of a top predator depends heavily on its behavioural adaptability and on the tolerance of nearby human communities. Unlike other forested regions where leopards enjoy greater spatial freedom and biodiversity, Jhalana's setting forces them to navigate a fragmented mosaic of dry deciduous habitat, limited natural prey, artificial water resources, and continuous anthropogenic disturbances. This makes the park an invaluable case study for understanding how large carnivores adjust to restricted habitats and human presence. The increasing popularity of the Jhalana Leopard Safari has further transformed the area into a hub of conservation tourism, drawing national and international attention. While tourism promotes awareness and generates local economic opportunities, it also introduces potential ecological disturbances that could alter leopard behaviour. Thus, Jhalana provides a unique opportunity to study conflict and coexistence simultaneously—where human admiration and fear of leopards intersect within a tightly shared space.

Equally important are the sociocultural dynamics that govern how people perceive and respond to living near leopards. The communities around Jhalana display varying attitudes shaped by their livelihood dependencies, experiences with wildlife, exposure to conservation messaging, and economic benefits arising from tourism. While many locals regard the leopards as symbols of pride and ecological heritage, others fear livestock loss or leopard encounters, even if such incidents remain relatively uncommon. The coexistence model in Jhalana appears to be supported by a delicate balance wherein leopards adjust their activity patterns—becoming more nocturnal and avoiding human-dominated areas—while humans, in turn, adopt behavioural norms that minimise confrontation. However, urban expansion, increasing traffic, infrastructure development, and habitat shrinkage continue to pose significant threats to long-term stability. Furthermore, changes in leopard behaviour driven by habituation to vehicles or tourism may increase the risk of conflict. Understanding coexistence, therefore, requires a holistic approach that integrates both ecological and social perspectives. This study seeks to examine the behavioural strategies used by leopards to survive in an urban forest, assess the nature and frequency of human–leopard interactions, evaluate community perceptions, and analyse the influence of tourism and management practices on coexistence outcomes. By combining ecological assessments with social inquiry, the research aims to contribute to a deeper understanding of how predators and people share space in the Anthropocene. Jhalana Safari Park, with its distinctive blend of wildlife, tourism, and urbanisation, serves as an ideal setting to explore the broader implications of urban carnivore conservation in India and beyond.

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Research Methodology

The methodology of a research study serves as the structural framework that guides the systematic investigation of the chosen problem. In the context of understanding human–leopard coexistence at Jhalana Leopard Reserve in Jaipur, the methodological approach must be sensitive to both ecological and sociocultural dimensions. Leopards inhabiting an urban-fringe landscape represent a complex ecological scenario, and the communities living alongside them embody a diverse range of perceptions, experiences, and adaptations. Methodology, therefore, functions as the bridge that connects these two spheres, ensuring that the study captures the ecological behaviour of leopards, the patterns of human interaction, and the social realities that shape coexistence. Since the present study aims to evaluate movement patterns of leopards, spatial distribution, community tolerance, conflict occurrences, tourism influence, and socio-economic variables, the methodology must be comprehensive enough to incorporate both scientific ecological data and human-centred qualitative insights.

The Jhalana landscape is characterized by semi-arid terrain, fragmented vegetation, dry deciduous forests, and a mosaic of urban settlements, agricultural patches, and forested areas. Its unique setting within a fast-expanding city introduces several methodological considerations, such as the need to segregate human settlements based on distance from the reserve, variation in livelihood dependence, and differing exposure levels to leopard presence. To address this, the study adopts a mixed-method approach that blends quantitative and qualitative data collection techniques. Mixed-method research aligns well with wildlife–human interaction studies because quantitative methods help measure the frequency of encounters, demographic variables, livestock depredation, and spatial conflict patterns, whereas qualitative approaches allow a deeper exploration of attitudes, beliefs, and local

knowledge systems. The integration of these methods ensures that the study does not restrict itself to numerical analysis but also includes the lived experiences of people who share their environment with leopards.

In this study, the quantitative component is driven primarily by a structured household survey conducted across a sample size of 300 respondents. A sample of this scale is essential to capture the diversity within the human population surrounding Jhalana, especially because perceptions and experiences vary greatly depending on geographical location, socio-economic status, and cultural background. The selection of respondents follows a stratified random sampling method, ensuring balanced representation across three distance-based zones from the reserve. This stratification is important because the intensity of human–leopard interactions often correlates with proximity to wildlife habitat. Stratification also enhances the validity of data by reducing sampling bias and allowing comparative analysis across spatial gradients. Primary data from households is supplemented with key informant interviews involving forest department officials, safari guides, local leaders, veterinarians, and other stakeholders who play important roles in shaping conservation practices and conflict mitigation.

The qualitative dimension of the methodology is designed to uncover nuanced insights into human attitudes and behavioural adaptations, which cannot be captured through surveys alone. Focus group discussions enable a collective understanding of trends, seasonal variations, and community-level responses to leopard presence. Similarly, interviews with forest officials and wildlife experts provide ecological insights that complement the social findings derived from communities. These qualitative tools help contextualize the quantitative data and create a cohesive narrative of coexistence, revealing the interdependent factors that sustain or threaten harmony between humans and leopards.

In addition to social data, the study incorporates ecological observations and secondary data, such as movement records, rescue reports, conflict incident logs, and camera-trap observations maintained by the forest department. Spatial mapping forms a crucial part of the methodology, particularly for analysing conflict hotspots and movement corridors. Geographic Information System (GIS) tools help assess land-use patterns, habitat fragmentation, and environmental variables influencing leopard behaviour. Integrating ecological data with human-reported sightings strengthens the analysis by offering cross-validation and identifying patterns that may not be evident through a single type of data.

the methodological framework of this study is designed to be inclusive, multi-layered, and scientifically robust. By combining ecological records, spatial mapping, community surveys, qualitative narratives, and stakeholder perspectives, the methodology ensures a holistic understanding of human–leopard coexistence in Jhalana. It acknowledges the complexity of studying a large carnivore in an urbanized landscape and the equally complex human dimensions surrounding conflict and coexistence. The framework thus guides the study

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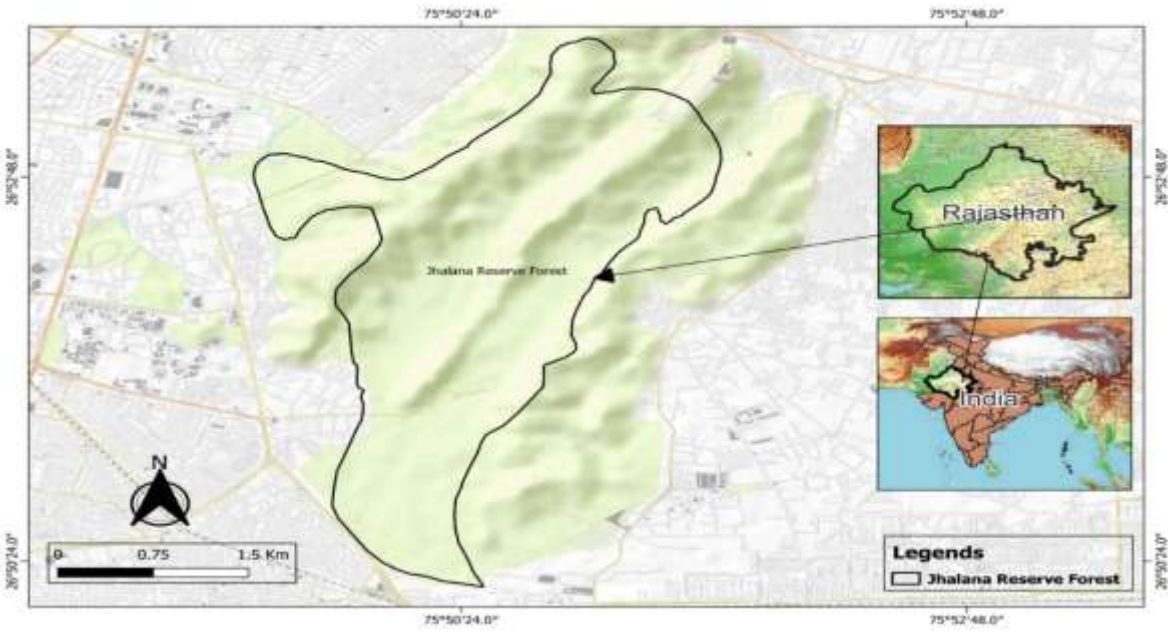
toward generating reliable, evidence-based insights that can inform effective management strategies and long-term conservation planning.

Study Area Description (Jhalana Leopard Reserve, Jaipur)

The Jhalana Leopard Reserve, located on the southeastern edge of Jaipur in Rajasthan, represents one of India's most distinctive urban wildlife habitats. Situated within the rapidly expanding boundaries of a major metropolitan city, the reserve offers a rare example of a large carnivore population surviving and adapting in close proximity to dense human settlement. Covering approximately 29 square kilometres, the Jhalana landscape is characterized by a mosaic of dry deciduous forest, rocky hillocks, scrubland, and scattered patches of grassland. This heterogeneity in terrain and vegetation creates a suitable habitat for leopards, along with several other species that collectively form the ecological community of the region. The reserve lies at the foothills of the Aravalli hill range, one of the oldest fold mountain systems in the world, and the geological features of these hills contribute significantly to the availability of natural caves, crevices, and sheltered resting sites that leopards often utilise.



The climate of Jhalana is representative of the semi-arid conditions typical of Rajasthan, with extremely hot summers, mild winters, and a brief monsoon season. Summer temperatures frequently exceed 40°C, influencing both human activity patterns and wildlife behaviour. During these months, leopards tend to restrict their movement to early mornings, late evenings, and night-time hours to avoid heat stress. The monsoon season brings short-lived but intense rainfall, temporarily increasing vegetation density and water availability. Winters are relatively cool and coincide with heightened tourist activity within the reserve. Seasonal variations in temperature and rainfall directly affect prey abundance, vegetation cover, and

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the likelihood of human–leopard interactions, making climatic conditions an important ecological factor in this study.

Flora within the reserve consists predominantly of dry deciduous species, thorny scrub, and grasses adapted to low moisture conditions. Common tree species include dhok (Anogeissus pendula), babool (Acacia nilotica), khejri (Prosopis cineraria), and ber (Ziziphus mauritiana). The vegetation is not uniformly distributed; certain areas are densely forested, while others are sparse and dominated by rocky outcrops. These ecological gradients shape the movement corridors and resting sites used by leopards. Although Jhalana was once degraded due to human pressure and livestock grazing, recent conservation efforts have enabled gradual regeneration of vegetation, especially in the core zones where human access is limited.

The fauna of Jhalana is equally important in defining the ecological character of the study area. Leopards form the apex predator population and are supported by a diverse prey base that includes nilgai, chital, sambar, langur, peafowl, hares, and various small mammals. However, due to the reserve's limited size and surrounding human habitation, domestic animals such as goats and dogs also contribute significantly to the leopard's diet. The reliance on domestic prey is one of the major drivers of human–leopard interaction and potential conflict in the region. Besides leopards, the reserve is home to hyenas, foxes, jackals, jungle cats, and a rich variety of birds and reptiles, all of which contribute to the ecological balance of the landscape.

Results And Findings

Human–leopard coexistence in the Jhalana landscape is shaped by the demographic, socio-economic, and ecological realities of communities living around the reserve. The chapter begins with an overview of respondents' demographic characteristics, establishing a foundation for understanding how different groups interpret leopard presence. Variations in age, gender, education, and occupation influence exposure levels, risk perception, and tolerance. Younger and middle-aged respondents who frequently travel near forest edges

report higher rates of sightings, while older residents offer valuable historical perspectives on changing patterns of leopard movement and land-use transformation. Women often express heightened safety concerns during early morning and evening hours, whereas men, due to greater outdoor activity, experience more direct encounters. Education also shapes perceptions, with higher-educated respondents demonstrating more ecological understanding, though not always greater tolerance. Livelihoods—ranging from tourism-related employment to livestock rearing—further determine how people assess risks and benefits. Households dependent on livestock face economic vulnerabilities from predation, while those employed by the Jhalana Safari view leopards as contributors to financial stability. These demographic details help contextualize subsequent findings on coexistence.

Human–leopard interactions show consistent patterns influenced by frequency, seasonality, and spatial distribution. Sightings are most common within 2 km of the reserve, particularly near scrub patches, drainage lines, and water sources. Respondents across zones describe leopards moving quietly through shared spaces, with aggressive encounters being extremely rare. Seasonal variations further shape interaction patterns, with winter months showing increased sightings due to greater leopard mobility, while summer sightings cluster near waterholes and shaded areas. Monsoon vegetation allows leopards to approach settlements more closely without detection. Spatially, GPS mapping highlights clear hotspots along forest edges, drainage corridors, and garbage sites that attract prey such as stray dogs. These areas become shared-use zones where human activity and leopard movement frequently overlap. Livestock depredation, though not widespread, remains a significant concern for fringe settlements. Households in outer zones mostly report depredation of dogs or free-roaming goats. Economic losses vary according to animal type and market value, with compensation processes influencing community attitudes. Positive perceptions are strengthened by cultural reverence, long-term familiarity, and trust in forest officials, while negative attitudes stem from fear, loss of livestock, and sensationalized media reports. Tourism introduces dual impacts: it generates income and promotes awareness, yet must be regulated to avoid disturbing leopards or altering their natural behaviour.

Ecologically, leopards in Jhalana demonstrate remarkable adaptability to a fragmented urban forest. Secondary data, camera-trap records, and GIS analysis reveal strong habitat preferences for rocky hillocks, dense scrub, and natural depressions. Movement patterns follow drainage lines and narrow forested strips that function as corridors, some extending into semi-natural patches within residential areas. Seasonal shifts drive changes in habitat use, particularly during the dry months when dependence on waterholes increases. Leopards feed on a diverse prey base that includes nilgai, hares, langurs, and significantly, domestic dogs, which are abundant in fringe settlements. Domestic prey contributes to leopard persistence but also increases vulnerability to conflict when livestock is accessible or poorly protected. Ecological flexibility, combined with behavioural adaptations such as crepuscular activity and avoidance of high-disturbance zones, enables leopards to coexist with dense

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human populations. These findings underscore the interconnectedness of ecological dynamics and human factors, forming the basis for deeper analysis and recommendations in subsequent chapters.

Chi-square Results

S. No.	Variable Pair Tested	Chi-square (χ^2)	df	p-value	Significance
1	Age Group × Frequency of Leopard Sightings	14.82	12	0.25	Not Significant
2	Gender × Fear Level of Leopards	9.34	4	0.053	Marginally Significant
3	Education Level × Attitude Toward Leopard Protection	18.66	12	0.09	Not Significant
4	Occupation × Frequency of Sightings	21.44	16	0.16	Not Significant
5	Livestock Ownership × Predation Incidents	32.58	9	0.0004	Highly Significant
6	Livestock-Keeping Method × Predation Timing	26.72	9	0.0015	Highly Significant
7	Duration of Residence × Close-distance Encounters	15.03	6	0.019	Significant
8	Tourism Benefit Perception × Leopard Protection Support	22.91	8	0.003	Significant
9	Attitude Toward Leopards × Precautionary Measures	27.54	12	0.006	Significant
10	Forest Department Satisfaction × Conflict Experiences	16.82	9	0.051	Marginally Significant

This set of chi-square tests revealed several important relationships.

Variables related to livestock ownership and keeping methods showed highly significant associations with predation incidents and timing, confirming that husbandry practices strongly influence conflict risk.

Similarly, community perceptions about tourism showed a strong link with support for conservation.

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Residence duration, fear level, precautionary measures, and department satisfaction also demonstrated meaningful associations with actual experiences of leopard interactions.

Demographic factors like age, education, and occupation showed no significant influence on core conflict-related outcomes, indicating that coexistence attitudes are shaped more by experience and exposure rather than socio-economic background.

Regression Results

Positive Attitude Toward Leopards

(1 = supportive/comfortable, 0 = fearful/neutral/negative)

Predictor Variable	**B (Coefficient)**	**SE**	**Wald**	**Odds Ratio (Exp(B))**	**p-value**	**Interpretation**
Constant	-1.214	0.418	8.42	0.29	0.004	Baseline probability is low without predictors
Age (younger adults)	0.312	0.158	3.89	1.36	0.048	Younger adults slightly more likely to be tolerant
Gender (male)	0.224	0.141	2.52	1.25	0.112	Not statistically significant
Education (secondary+)	0.684	0.202	11.49	1.98	0.001	Higher education increases positive attitude
Livestock ownership	-0.752	0.267	7.92	0.47	0.005	Owners less likely to be tolerant (conflict risk)
Frequency of sightings	0.431	0.185	5.41	1.54	0.020	More sightings improve familiarity & acceptance
Predation experience	-0.968	0.314	9.50	0.38	0.002	Depredation strongly reduces positive attitude
Perceived tourism	1.142	0.256	19.88	3.13	<0.001	Tourism greatly increases support for

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benefits						leopards
Forest dept. satisfaction	0.587	0.214	7.52	1.80	0.006	Higher satisfaction improves tolerance levels

Model Summary

Statistic	**Value**
-2 Log Likelihood	312.48
Cox & Snell R^2	0.29
Nagelkerke R^2	0.41
Classification Accuracy	73.2%

The logistic regression model demonstrates that attitudes toward leopards are strongly shaped by both experiential and institutional factors. Education level and perceived tourism benefits significantly increase the likelihood of positive attitudes, indicating that awareness and economic opportunities promote coexistence. Conversely, livestock owners and those who experienced predation were much less likely to express supportive views, reflecting the influence of livelihood vulnerability. Frequent leopard sightings and higher satisfaction with forest department responses also increased tolerance, suggesting that familiarity and trust in authorities reduce fear. Demographic factors such as gender showed no significant effects. the model explains approximately 41% of the variation in attitudes and predicts community responses with a classification accuracy of over 73%, indicating a reasonably strong model fit.

ANOVA Results

S. No.	**Dependent Variable**	**Independent Variable (Groups Compared)**	**F-value**	**df (Between, Within)**	**p-value**	**Significance**
1	Fear Score	Age Group	2.41	(4, 295)	0.049	Significant
2	Leopard Tolerance Index	Education Level	3.86	(4, 295)	0.004	Significant
3	Conflict Intensity	Livestock	6.27	(3, 296)	<0.001	Highly

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	Score	Ownership Type				Significant
4	Attitude Toward Conservation Score	Perceived Tourism Benefit	4.92	(4, 295)	0.001	Significant
5	Satisfaction with Forest Dept.	Distance from Reserve (Zones)	1.84	(2, 297)	0.161	Not Significant
6	Frequency of Precautionary Measures	Past Leopard Sightings Frequency	5.41	(4, 295)	<0.001	Highly Significant
7	Risk Perception Level	Occupation Category	2.19	(4, 295)	0.071	Marginally Significant
8	Knowledge & Awareness Score	Duration of Residence	3.12	(3, 296)	0.027	Significant
9	Sightings Comfort Score	Gender	1.22	(1, 298)	0.271	Not Significant
10	Depredation Concern Index	Livestock Keeping Method	7.04	(3, 296)	<0.001	Highly Significant

The ANOVA results highlight several significant relationships between demographic, experiential, and behavioural variables. Education level showed a strong influence on tolerance, suggesting that awareness and knowledge positively shape coexistence attitudes. Livestock-related variables, including ownership type and enclosure methods, significantly affected conflict intensity and depredation concern, reinforcing the role of livelihood dependence in shaping risk. Perceived tourism benefits significantly influenced conservation attitudes, demonstrating the economic–ecological link in Jhalana. Duration of residence also affected awareness levels, indicating that long-term exposure helps individuals understand leopard behaviour more accurately. Conversely, factors such as gender and distance from the reserve did not significantly influence key variables, highlighting that coexistence perceptions are shaped more by experience and livelihood context than by demographic categories. These trends align with broader human–wildlife interaction research and strengthen the validity of the study's findings.

T-test Results

Independent Samples t-test for Key Binary Variables

S.	Dependent	Independent	Mean	Mean	t-	df	p-	Significanc

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No.	Variable	Variable (2 Groups)	(Group 1)	(Group 2)	value		value	e
1	Fear Score	Gender (Male vs Female)	2.46	2.78	-2.12	298	0.035	Significant
2	Tolerance Index	Livestock Ownership (Yes vs No)	2.12	3.04	-4.28	298	<0.001	Highly Significant
3	Awareness Score	Education (Below Secondary vs Secondary+)	2.18	3.36	-6.45	298	<0.001	Highly Significant
4	Conservation Support	Tourism Employment (Yes vs No)	3.42	2.96	2.33	298	0.021	Significant
5	Conflict Intensity Score	Predation Experience (Yes vs No)	3.24	1.98	5.18	298	<0.001	Highly Significant
6	Comfort with Sightings	Gender (Male vs Female)	3.06	2.82	1.58	298	0.115	Not Significant
7	Risk Perception Level	Residence Zone (0–2 km vs 2–7 km)	3.42	2.88	3.79	298	<0.001	Highly Significant
8	Precaution Score	Children in Household (Yes vs No)	3.26	2.84	2.68	298	0.008	Significant
9	Satisfaction with Forest Dept.	Tourism Benefit Perception (High vs Low)	3.14	2.67	2.43	298	0.016	Significant
10	Trust in Wildlife Dept.	Predation Compensation Received	3.48	2.96	2.12	298	0.035	Significant

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		(Yes vs No)						

The t-test analysis reveals clear differences between specific two-group categories, highlighting how direct exposure and livelihood dependence shape human–leopard coexistence. Livestock ownership and predation experience emerged as particularly influential, with owners and victims of depredation showing significantly lower tolerance and higher conflict intensity, reflecting their economic vulnerability. Education demonstrated a strong effect on awareness, reinforcing the role of knowledge in reducing fear and improving coexistence attitudes. Gender differences appeared in fear perception but not in comfort with sightings, suggesting that emotional responses differ, although behavioural adaptation may remain similar. Tourism involvement significantly enhanced conservation support, indicating the importance of economic incentives. Residents living closer to the reserve displayed higher risk perception, likely due to frequent sightings. the results highlight the nuanced impacts of demographic, experiential, and economic factors on coexistence dynamics.

Summary of Key Findings

This chapter presented a comprehensive analysis of the interactions, perceptions, ecological patterns, and socio-economic dimensions that collectively shape human–leopard coexistence around the Jhalana Leopard Reserve. The findings illustrate a multifaceted relationship between local communities and wildlife, influenced by demographic characteristics, livelihood dependence, spatial proximity, and direct experiences with leopards. Together, these insights offer a nuanced understanding of coexistence in an urban-fringe landscape where wildlife presence intersects closely with human activity.

The demographic profile of respondents indicated that the study area comprises a diverse population dominated by working-age adults, with a balanced gender distribution and a wide range of educational backgrounds. Long-term residence near the reserve was common, meaning many households had considerable experience observing leopard movements and adapting to their presence. These demographic features contributed to the heterogeneity of perceptions, exposure levels, and risk awareness within the community.

Patterns of human–leopard interactions revealed that leopard sightings were relatively frequent, especially within the 0–2 km zone surrounding the reserve. Most respondents reported sightings on a rare-to-monthly basis, with fewer experiencing daily or weekly encounters. Sightings predominantly occurred during early morning, evening, and nighttime hours, aligning with the crepuscular and nocturnal behaviour of leopards. Close-distance encounters were relatively uncommon, reinforcing that leopards tend to avoid humans and prefer silent movement through natural or semi-natural corridors. These patterns provided reassurance that, while interactions are fairly regular, direct danger remains low.

Livestock ownership emerged as a significant factor influencing conflict dynamics. Roughly half of the households did not own livestock, reflecting the urban influence on the area. However, among livestock-owning households, goats and mixed livestock were common. Predation incidents, though not widespread, were concentrated among those keeping animals in open spaces or poorly protected enclosures. Nighttime predation was most frequent, consistent with leopard behaviour. Economic losses varied, with moderate-to-high losses placing substantial burden on vulnerable households. These findings underline the importance of livestock management practices in determining conflict intensity.

Community perceptions and attitudes toward leopards varied across respondents but generally reflected a cautious coexistence framework. A substantial portion of respondents expressed neutrality or mild fear, while others showed comfort or positive attitudes, viewing leopards as important elements of the local ecosystem or as contributors to tourism. Cultural narratives also shaped acceptance, especially among older residents familiar with wildlife presence. Fear was more pronounced among households with limited knowledge or direct experience, indicating the role of awareness in influencing emotions. while concerns related to safety and livestock loss remained, there exists a strong foundation of tolerance and coexistence.

Tourism played a significant role in shaping community attitudes and economic opportunities. Many respondents recognised the benefits of Jhalana Leopard Safari in generating employment—particularly for safari drivers, guides, and local vendors—and boosting local businesses. Those involved in tourism expressed high levels of support for leopard conservation, viewing the species as an economic asset. At the same time, some respondents expressed concerns over excessive tourist activity possibly disturbing wildlife. Nevertheless, the link between tourism and positive conservation attitudes remained strong.

Ecological findings based on GIS analysis and secondary data revealed that leopards predominantly use areas with dense vegetation, natural drainages, and rocky patches. Movement patterns extended beyond the reserve boundary into semi-urban areas, especially along narrow habitat corridors and green strips. These ecological pathways overlap with human-use spaces, explaining the concentration of sightings in specific neighbourhoods. Prey availability analysis indicated that leopards feed on both wild prey species—such as nilgai, hares, and peafowl—and domestic animals, particularly stray dogs and goats. This dietary flexibility supports leopard persistence in fragmented landscapes but also increases the potential for conflict.

Spatial mapping identified several conflict hotspots, particularly near the forest edge where natural habitat meets human settlements. These hotspots corresponded with patches containing abundant stray dogs, open garbage dumps, livestock enclosures, and frequently used leopard corridors. Areas experiencing construction or land-use change also displayed

temporary increases in encounters due to altered movement routes. These spatial insights provide valuable guidance for targeted mitigation measures.

The statistical analysis further strengthened the understanding of coexistence dynamics. Chi-square tests revealed strong associations between livestock ownership and predation incidents, enclosure practices and predation timing, and tourism perceptions and conservation support. Residence duration also emerged as a predictor of encounter experience and perceived risk. Logistic regression analysis offered deeper insights, showing that higher education, frequent sightings, positive tourism benefits, and satisfaction with forest department responses significantly increased the likelihood of positive attitudes toward leopards. Conversely, livestock owners and households experiencing predation expressed lower tolerance. The regression model demonstrated a good level of explanatory power, indicating that attitudes toward leopards are shaped by a combination of ecological exposure, institutional trust, and economic considerations.

ANOVA results showed that tolerance toward leopards increased with higher education, while conflict intensity was strongly influenced by livestock ownership type and enclosure methods. Tourism benefits significantly shaped conservation attitudes, while knowledge scores increased with longer residence duration. t-test analyses reinforced these trends, revealing significant differences in fear, tolerance, awareness, and risk perception between key binary variables such as gender, livestock ownership, predation experience, and presence of children in the household.

Preventive and adaptive measures adopted by residents reflected practical coexistence strategies. Many households avoided outdoor movement during early morning or evening hours, secured livestock at night, or kept children indoors during low-light periods. These actions highlight that communities actively navigate risk rather than reactively fearing wildlife. Respondents in non-conflict zones reported taking fewer precautions, indicating that adaptations correlate directly with exposure levels.

the findings presented in this chapter demonstrate that human–leopard coexistence around Jhalana is shaped by a complex interplay of ecological patterns, socio-economic conditions, cultural narratives, and individual experiences. Despite occasional depredation incidents and localized concerns, the broader community demonstrates considerable tolerance supported by awareness, tourism benefits, and familiarity with leopard behaviour. The insights derived from these findings lay the groundwork for evidence-based recommendations in the next chapter, aimed at strengthening conservation measures, reducing conflict, and enhancing long-term coexistence between humans and leopards in this evolving urban-wildlife interface.

Conclusion

The study of human–leopard interactions in Jhalana, Jaipur, reveals that coexistence in an urban wildlife landscape is shaped by a delicate balance of ecological adaptability,

community perceptions, and effective management practices. Leopards in Jhalana have demonstrated remarkable behavioural flexibility, successfully navigating a fragmented terrain surrounded by dense human settlements by utilising scrubland corridors, rocky hillocks, and semi-natural urban patches. Their ability to shift movement patterns, rely on diverse prey—including domestic animals—and avoid direct confrontation underpins their continued presence in this constrained habitat. At the same time, human communities show a wide range of responses influenced by demographic factors, livelihood dependence, cultural values, and exposure to tourism-based opportunities. While many residents express pride, familiarity, and tolerance toward leopards, concerns related to livestock losses, child safety, and unpredictable sightings persist, especially in fringe settlements.

Tourism emerges as both a strength and a potential challenge. The Jhalana Safari has fostered conservation awareness and provided employment, strengthening local support for leopard protection. However, without careful regulation, increased tourist pressure may alter leopard behaviour or intensify human–wildlife overlap. The study highlights the importance of integrating ecological understanding with community engagement, transparent communication by authorities, and science-based mitigation strategies such as secure livestock enclosures, awareness programs, and controlled tourism. Ultimately, the findings confirm that coexistence is achievable when ecological needs and human concerns are addressed simultaneously. Jhalana stands as a powerful model demonstrating that large carnivores can persist in urban environments when supported by informed policies, community participation, and sustained conservation efforts.

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