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Research article

Characterization and management of human-wildlife conflict in Judibela of Rautahat, Nepal

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Abstract

The attitude of people towards target wildlife species plays an important role in determining whether the conservation plans be implemented. This study examined the analysis of human-wildlife conflict patterns and factors by utilizing data gathered from literature, government records, and a questionnaire survey. The study also evaluated the temporal and spatial occurrence of human casualties, crop damage, and livestock losses resulting from interactions with wildlife. Furthermore, the study assessed the local community's perspective on wildlife conservation as it pertains to the preservation of biodiversity. The Likelihood Ratio test was employed to establish the connection between socio-demographic factors and human-wildlife conflict (HWC) that shows an association between occupation and age groups with HWC. The study identified three primary forms of conflict between humans and wild animals: crop-raiding, livestock depredation, and human injuries. Maximum conflict incidences occurred in crop fields on average of (75.49%) in which human injury was recorded (66.67%) and Crop raiding 84.31%, followed by the settlement area (64.29%). A total of 87.13% respondents believed that wild boar is the most conflicted wild animal encountered more at night. The other reported monkey is the second most conflicted wild animal which encountered morning (26.73%), afternoon (27.72%), and evening (45.54%). The exponential decay analysis showed that the number of conflict incidences decreases with an increase in distances from the forest. The majority of respondents (86.15%) expressed a strong wish to conserve wild animals, recognizing their crucial role in maintaining ecosystem balance. Additionally, 93.07% of respondents indicated their intention to educate their children about the importance of biodiversity conservation. Despite their positive attitudes towards wildlife conservation and management, respondents also acknowledged the need for compensation in cases of losses caused by wild animals demonstrating their commitment to both sustainable conservation and practical considerations in wildlife interactions.

Keywords: Crop-raiding; human injury; human-wildlife conflict; livestock depredation, people's perception

1 | Introduction

Human-wildlife conflict (HWC) is a matter of worldwide significance, encompassing unfavorable interactions involving humans and wildlife, as well as conflicts among humans concerning wildlife. The confrontation between humans and wildlife has gained global acknowledgment as a major obstacle in the context of wildlife conservation (Attia et al. 2019). HWC is a two-way process in which both humans and animals experience adverse effects from the conflict. It is one of the most complex challenges in the field of wildlife management and conservation (Frank et al. 2019) especially located outside protected areas. Consequently, people often respond by killing the animals involved in these conflicts (Acharya et al. 2016). As a second point, conflicts often revolve around larger mammal species, many of which are already endangered. In a third aspect, the consequences of illegally removing endangered animals could potentially intensify negative attitudes towards conservation endeavors (Sodhi et al. 2010; Bista & Song 2022). Research conducted on the subject of Human-wildlife conflict (HWC) has indicated the importance of tailoring approaches to specific locations. By implementing well-suited strategies, it is possible to diminish human-wildlife conflicts, improve damage to crops and livestock, and enhance the well-being of local communities (Thapa & Kelly 2017). HWC generally take place in a nonlinear manner across a spectrum of development, with greater instances of interaction happening within the middle stages of development, specifically in rural and suburban settings near natural habitat patches or green areas (Poessel et al. 2013). Typical manifestations of HWC in the Nepal Himalayas encompass incidents such as crop raiding, property damage, predation on livestock, and occurrences of human injuries and fatalities resulting from wildlife attacks (Pandey & Bajracharya 2015). The participation of people in wildlife management is important to minimize the HWC and achieving towards sustainable conservation (Woodroffe & Redpath 2015). The measures commonly undertaken include government-sponsored relief fund or compensation to address wildlife related damages, the cultivation of substitute crops like tea, lemon, and ginger, construction of watchtowers for safeguarding crops, excavation of trenches, installation of electric fences, vocal deterrence, and utilization of fire as a deterrent (Neupane et al. 2017). The human attitude involves both emotions and beliefs that influence how people interact with wildlife in their vicinity (Richard et al. 2014). Therefore, improving local people

perception toward conservation is essential for enhancing the relationship between people and protected areas (Ciocănea et al. 2016; Mir et al. 2015). The objective of this research was to (i) assess various occurrences of HWC (ii) the mitigation measures currently employed by the local community (iii) their perspectives on HWC within the study area. The findings of this study are expected to assist relevant authorities, such as the Division Forest Office in Rautahat in developing enhanced management strategies to promote harmonious coexistence between humans and wildlife.

2 | Materials and methods

2.1 | Study area

The study area was purposively selected in Judibela of Chandrapur Municipality in the Rautahat District, low land Nepal. The municipality covers about 65.35% of forest land in the form of community forests and private forests. Similarly, cultivable land covers approximately 24.64%, built up area about 2.95% and river and flood plain area cover about 2.56%. The region has three types of climates: Dry Monsoon from March to mid-June, Monsoon from May to September, and Winter from November to February. The average minimum temperature is 7.86°C, while the average maximum temperature can reach 35.37°C. The region gets about 1600 mm of rain every year. The main rivers in the area are the Bagmati River in the east and Bhansar Khola in the west and Chandi Khola connects with Judibela. This area is highly diverse with wild animals and biodiversity. The forests have many animals, such as Elephants, Wild boars, Foxes, Monkeys, and birds like Mayur, Dhukur, Eagle, Vulture, Crow, Parrot, Kalij, and trees like Simal, Saal, and bamboo. Some animals like Wild boars, Nilgai, Elephants, and Monkeys can be a problem because they damage crops. The main ethnic groups in the area are the Tharu and Tamang people. The total population is 81,807, with 40,304 males and 41,503 females, living in 16,820 households (Chandrapur Municipality Profile 2076). Judibela lies between the latitude 27° 06' 43" and 27° 09' 33" north and longitudes 85° 22' 36" and 85° 25' 28" and is located between 132 meters to 165 meters from mean sea level. The terrain of Rautahat comprises delicate Chure hills in the northern district and plains in the southern region. The northern belt of the district primarily hosts these forests, encompassing 26% of the total territory, even though the majority of the population resides in the southern part of the district.

2.2 | Study population, sample size and sampling

As per the Municipality Profile of Chandrapur Municipality, Judibela accounts for 1164 households. In order to conduct a household survey in Judibela, an appropriate sample size was determined using the formula provided by Krijice and Morgan in 1970. This calculation considered crucial statistical parameters, including population size, a confidence limit of 95%, and a margin of error of 10%. As per the formula, a sample size of 89 was recommended; however, a total of 101 households were surveyed in the study. A stratified random sampling technique was applied to select the households for the survey. The settlement was categorized into three strata based on the distance from the forest edge: <100 m (closest to the forest), 100-200 m (moderate distance from the forest), and above 200 m (farthest from the forest). The determined sample size was then allocated across these three strata in a non-proportional manner. Within each stratum, a specified number of households were selected using a simple random sampling method, facilitated by a random number table. This rigorous approach ensured a representative and unbiased selection of households for the survey.

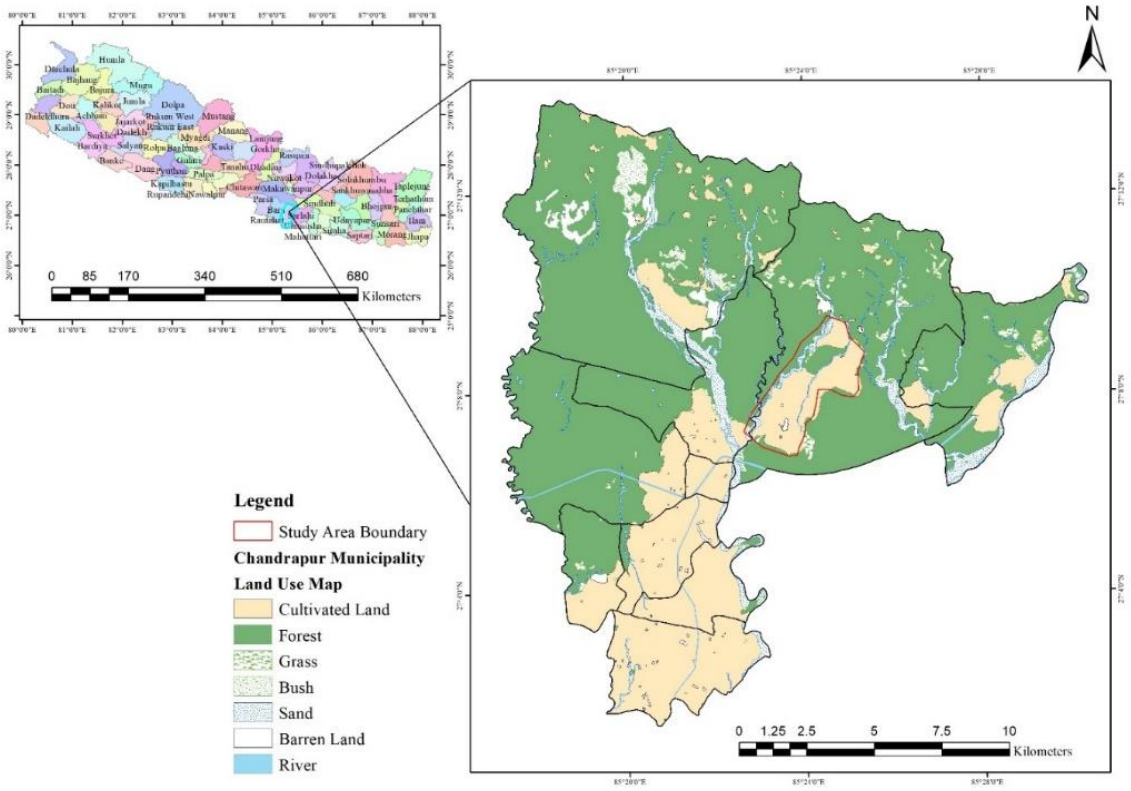

Figure 1. Map of the study area

2.3 | Data collection

The data collection process was precisely performed, employing a diverse range of methods to ensure a comprehensive scope. Primary data was gathered through field observation based on individual questionnaire survey, two key informant interviews, and two focus group discussions, which were facilitated by checklists, and structured and unstructured questionnaires. A checklist was precisely employed to assess wildlife conflict status and habitat components. Valuable insights into conservation threats and management strategies were gathered from engaged interactions with local people and the Community Forest Management team. Household surveys were conducted in selected households using structured survey questionnaires, targeting household heads, and in the absence of such, educated adults were approached. The survey questionnaire covers sociodemographic information as well as attitudes toward wildlife conservation. To measure the attitude Likert Scale was used. Similarly, a set of questionnaires was applied to identify the most effective mitigation measures implemented in the study area to prevent HWC. Key informant interviews (KII) were conducted with prominent figures including the Divisional Forest Officer, Vice President of community forest user group (CFUG), and Former Chief district officer of Rauthat district in Judibela, yielding invaluable insights on HWC in the study area as well as on the Nepal government acts and policies.

Additionally, focus group discussions (FGD) were organized with farmer groups and CFUGs, serving as a litmus test to validate and expand upon the findings procured from the household questionnaire surveys. As a participatory research approach continuous observation and verification were done during the entire field research period, complemented by photographic documentation, detailed notes, and precise GPS coordinates for precise mapping of conflict zones.

Secondary data were collected from the records of the Divisional Forest Office (DFO) of Rauthat district, and the Community Forest Management records, which were thoroughly looked over and analyzed. This was further complemented by a comprehensive review of published articles, related theses, and comprehensive forest annual reports. Finally, data on human-wildlife conflict, alongside vital environmental parameters such as temperature, rainfall patterns, population demographics, and vegetative types, were precisely sourced from the profile of Chandrapur Municipality, culminating in a multi-faceted and comprehensive approach to data collection.

2.4 | Data analysis

Descriptive statistical tools, including measures like mean, standard error (SE), frequency, and percentage were employed to summarize socio-demographic variables, as well as the spatial distribution of conflicts and people's attitudes towards wildlife conservation. Additionally, bar charts and frequency distribution tables were used to present the findings. The trend analysis, Likert scale analysis and respective descriptive analysis were carried in additional Microsoft Excel.

3 | Results

3.1 | Socio-demographic characteristics of HHs

Out of the total 101 households surveyed, 79.21% were headed by males, while 20.79% were headed by females. Similarly, among the total respondents (n=101), 14.85% were below 40 years old, 70.30% fell within the age group of 40 to 60 years, and the remaining (14.85%) were 61 years and older. Furthermore, more than half of the respondents (86.14%) identified themselves as farmers, while 3.96% were engaged in social work, another 3.96% were students, and the remaining 5.94% worked as teachers. Furthermore, 37.63% of respondents had reported crop loss, 2.97% had reported livestock depredation, 8.91% reported both livestock and crop loss,1.98% reported livestock depredation, crop loss and property damage, and 47.52% reported not any types of conflicts (Table 2).

Table 2. Types of elephant human conflict and affected respondents

Type of conflict	Respondent %
Crop loss	37.63
Livestock depredation	2.97
Property damage	0.99
Both livestock depredation and crop loss	8.91
Livestock depredation, crop loss and property damage	1.98
No any conflict	47.52

3.2 | Association between demography of respondents and human-wildlife conflict

A likelihood ratio test was performed to identify the relationship between socio-demographic variables and HWC. The results of an examination into the association between socio-demographic factors and human injury or casualties arising from wildlife conflicts in three key variables: Gender, Age, and Occupation showed the likelihood coefficient is 0.145, with a p-value of 0.704. This association is not statistically significant (p-value>0.05) suggesting gender of respondents does not significantly influence the likelihood of experiencing wildlife-related incidents. Conversely, Age displays a substantial impact, where the coefficient of the likelihood ratio is 9.046 and the p-value is 0.011, suggesting a significant association with human-wildlife incidents. Indeed, younger individuals may be more likely to engage in activities that involve traveling, which could potentially lead to a higher likelihood of encountering wildlife and consequently an increased risk of incidents. This could be a contributing factor to the higher incidence of wildlife-related incidents among individuals below 40 years of age. In terms of occupation, a likelihood ratio coefficient of 8.81 with p-value of 0.042, signified an association of experiencing injuries or casualties due to human-wildlife conflict. It is possible that certain occupations involve more direct interaction with wildlife, leading to a higher likelihood of incidents (Table 2).

Table 2. Association between socio-demographic and human injury/casualties due to wildlife conflict

Variable	Categories	Coefficient		
		Likelihood ratio	df	*p*-value
Gender	Male	0.145	1	0.704
	Female			
Age	Below 40 years	9.046	2	0.011
	41-60 years			
	61 years above			
Occupation	Farmer	8.810	3	0.042
	Politician			
	Student			
	Teacher			

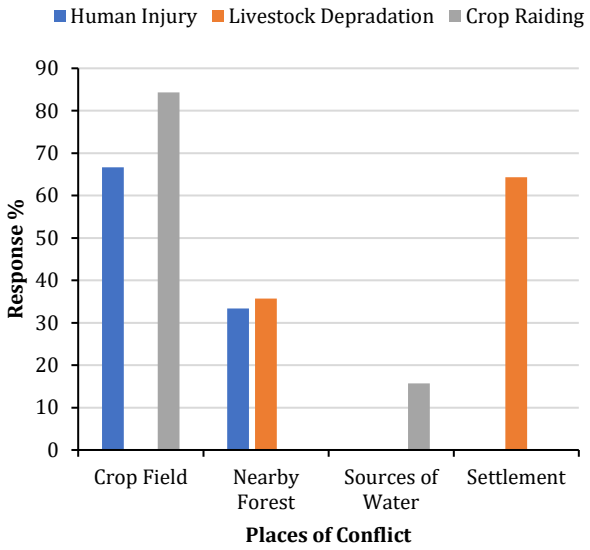

Figure 2. Spatial distributions of conflicts

3.3 | Spatial distributions of conflict

Maximum conflict incidences occurred in crop fields in an average of 75.49% in which human injury was found 66.67% and Crop raiding 84.31%, followed by the settlement area (64.29%). The wild animals were also found nearby forests i.e. 34.52% in which human injury was found 33.33% and livestock depredation 35.71%, probably for easy prey (livestock). Similarly, 15.69% of the conflict was recorded nearby water sources (Figure 2).

3.4 | Distribution of conflicts

As the distance increases, there is a noticeable decline in the number of conflict incidents. At a distance of 50 meters from the forest edge, the highest number of incidents is recorded, with 39 cases. This number substantially decreases to 17 incidents at 100 meters, followed by a further decrease to 6 incidents at 150 meters, and 5 incidents at 200 meters. A clear exponential decay pattern emerged when analyzing the relationship between the number of conflicts and their respective distances from the forest edge. This trend is aptly described by the exponential decay equation y= 71.912e^(-0.014)x, where x represents the distance of conflict incidence from the edge of the forest, and y denotes the number of conflict incidences. The high coefficient of determination (R^2=0.9411) reinforces the robustness of this trendline, signifying an impressive 94.11% fit to the exponential decay model (Figure 3).

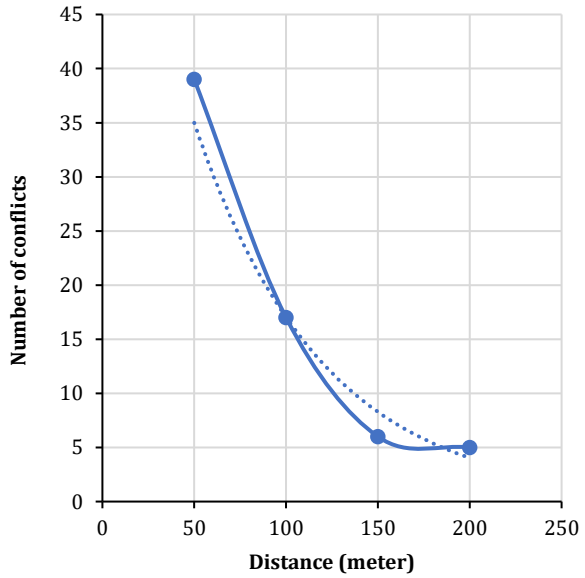

Figure 3. Number of conflict incidences from forest edges

3.5 | People's attitude toward wildlife conservation

Five questions were presented to the respondents for assessing the attitude of people toward wildlife conservation. The overall mean attitude of people toward wildlife conservation was found positive (3.33±0.13 SE). All of the respondents (100%) wanted to conserve wild animals thinking that they play important role in ecosystem balance (86.15%)) and wanted to teach their kids about conservation (93.07%). The minimum proportion (4.95%) of the respondents were unaware of the suitable place for protecting the species. None of the respondents were ready to bear the livestock loss to wild animals. In the same way, none of the respondents wanted to kill the species if entered the settlement. The maximum number of the respondents (77.23%) wanted to inform the community forest office. Whereas 15.84% of the respondents wanted to chase them away by themselves and only 3.96% of them wanted to maintain a safe distance from the wild animals (Table 3).

Considering the practical significance of the attitudes reflected in the last two questions (Table 3) for the conservation of wild animals, the overall mean attitude of local people towards these questions was evaluated and yielded a positive result (2.27±0.10 SE). It was crucial to examine whether the two sets of questions (First questions - Set I, Last two questions - Set II) were associated with each other. Consequently, a strong association was found, with a correlation coefficient (r) of 0.74 (Figure 4).

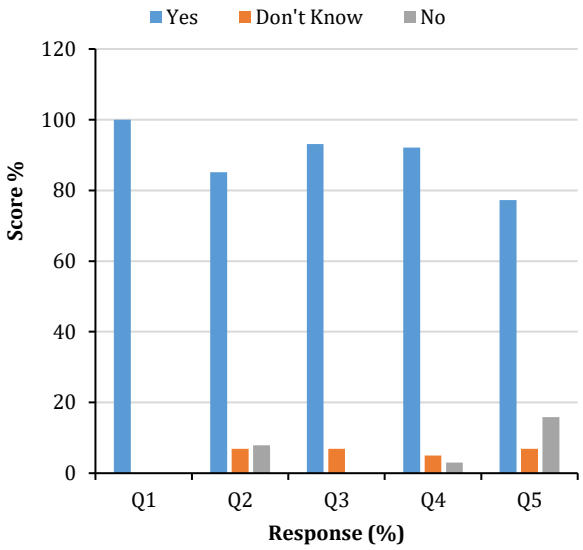

Figure 4. Distribution of attitude scores in five questions. Q1: Would you like to conserve Wild animals? Q2- Do you think the conservation of this animal is beneficial for the environment? Q3- Should you teach your kids about wildlife conservation? Q4: Where wild animals should be protected? Q5: What should be done when any wild animals enter the settlement?

Table 3. Questions and attitude scores

Questions	Responses	Score	% of respondents
1. Would you like to conserve Wild animals?	Yes	1	100
	No	-1	0
	Do not Know	0	0
2. Do you think the conservation of this animal is beneficial for the environment?	Yes	1	85.15
	No	-1	7.92
	Do not Know	0	6.93
3. Should you teach your kids about wildlife conservation?	Yes	1	93.07
	No	-1	0.00
	Do not Know	0	6.93
4. Where wild animals should be protected?	National Park	1	92.08
	Zoo	-1	2.97
	Do not Know	0	4.95
5. What should be done when any wild animals enter the settlement?	Inform Community Forest	1	77.23
	Stay Away	0	3.96
	Bear loss	2	0.00
	Do nothing	0	2.97
	Chase them away	-1	15.84
	Kill	-2	0.00

4 | Discussion

4.1 | Association between demography of respondents and human-wildlife conflict

In contrast to this finding, despite women shouldering an uneven share of the workload, approximately half of the survey participants believed that both men and women were impacted equally (Ogra 2008). The study area revealed varying effects on wildlife across different age groups. This divergence can be attributed to individuals below the age of 20, who are predominantly occupied with school or college commitments, and consequently, they do not venture into nearby forests. In contrast, individuals aged 20 and above are more engaged in farming, gathering firewood, and various other activities, making them more likely to interact with wildlife. A similar study shows that the middle age (41-60 years old) was more likely impacted as they are engaged in outdoor occupations (Baral et al. 2021). Similarly, in the study area, a significant likelihood ratio has been established between one's occupation and the occurrence of human-wildlife conflicts. This significance arises from the fact that the majority of individuals in the area are employed in farming, a profession inherently more prone to encounters with wild animals compared to other occupations such as teaching, student life, and political involvement.

4.2 | Spatial distributions of conflict

Human-wildlife conflict involves occurrences such as predation on livestock, raiding of crops, and damage to infrastructure (Linnell & Cretois 2018). Crop damage and livestock attacks were the most prevalent among the frequently occurring attacks (Pisa & Katsande 2021). Livestock predation by wild animals, along with the retaliatory reactions it triggers, can lead to substantial adverse consequences for both human populations and carnivorous animals (Wang, et al. 2019). Encounters between humans and wild animals that result in conflicts have detrimental effects on both human populations and the wildlife involved (Mekonen 2020).

The crop-raiding is high in Judibela because the settlement and the crop fields are surrounded by forest. The result is also supported by the finding of cropland parcels experienced high crop raiding which was strongly related to the distance from parcels to forest edges (Bista & Song 2022). The predation of crops and livestock by wild animals stands as a significant driver of human-wildlife conflict, presenting a worldwide threat to the coexistence of humans and wildlife (Goswami et al. 2015). The study area reported very few incidents of human injury or damage. This can be attributed to increased awareness about wild animals, the complete prohibition of cattle grazing in the area, and the absence of nighttime activities by people. This result is further corroborated by records from the DFO, which indicate no instances of human injury or damage by wild animals in Judibela village. Furthermore, information gathered from KII and FGDs provides additional support to these findings. The major conflicts are in crop fields followed by settlement i.e. easy prey for predators. Similarly, the chance of a conflict of both crop raiding and livestock depredation increases near the forest. DFO in coordination with CFUGs, has made an artificial pond near the crop fields as a source of drinking for wild animals. Thus, conflict is also found nearby sources of water in the crop fields.

Human settlements located near forests are likely to continue facing the risk of elephant-induced crop damage and various other types of conflicts between humans and wild animals (Goswami et al. 2015). As households and farms are situated closer to the boundary of wild animals' habitat, the likelihood of conflicts between humans and wild animals intensifies (Makindi et al. 2012) and (Acharya et al. 2016).

4.3 | Distribution of conflicts

Communities residing near forested areas are likely to continue facing the risk of crop damage and various other types of conflicts between humans and wild animals (Derebe et al. 2022). Moreover, the distances from the forest edge increase, the number of human-wildlife conflict incidences constantly decreases.

4.4 | People's attitude toward wildlife conservation

It revealed that people would express very positive views if they were asked about conserving wildlife in general. But the tendency inclined towards neutral when the questions were related to the specific places for the protection of the species depending upon age, level of education and distance from forest (Hariohay et al. 2018). It might be due to the so-called farsightedness of people for escaping themselves from unseen threats of the wild animals. Nevertheless, the benefits

introduced might not have necessarily altered the attitudes of individual people, as these benefits were primarily directed towards the community rather than individuals. To ensure the enduring conservation of wildlife, it's crucial for individuals to experience direct advantages from conservation efforts. For instance, since many local residents rely on natural resources such as firewood, timber, construction materials, and bushmeat for sustenance and income, these tangible benefits play a significant role.

5 | Conclusions

Human-wildlife conflicts are scattered in Judibela ranging from the edge of the forest to the core of the village. The activities of wild animals especially wild boar, monkey, and jungle cows are naturally higher in the crop field and near the forest edges. The easy prey and the corridors of wild animals are the major causes of the conflicts. It is facilitated by crops field and vegetative areas to camouflage themselves and proceed with the activity of crop-raiding and livestock depredation. Due to decreasing trends of HWC, people show a very positive attitude toward wildlife conservation. They have applied various measures such as fencing in cropland, feeding domestic animals in the house/goth, no activity at night, and proper monitoring of crop fields to prevent wild animals' damage which is very successful.

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Authors' contributions

BC: Conceptualization, research design, data collection, data entry, management and analysis, manuscript write-up and revision; NPK: Conceptualization, research design, Manuscript write up and revision, supervision; SP: Data analysis, manuscript.

Conflicts of interest

The authors declare no conflict of interest.

References

Acharya K., Paudel P., Neupane P. and Kohl M. 2016. Can forest fragmentation and configuration work as indicators of human–wildlife conflict? Evidences from human–death and injury by wildlife attacks in Nepal. PLoS ONE, 11(9):e0161717. https://doi.org/10.1371/journal.pone.0161717

Attia T.S.N., Martin T.N., Forbuzie T.P., Angwafo T.E. and Chuo M.D. 2019. Human-wildlife conflict: causes, consequences and management strategies in Mount Cameroon National Park South West region, Cameroon. International Journal of Forest, Animal and Fisheries Research, 2(2):34–49. https://doi.org/10.22161/ijfaf.2.2.1

Baral K., Sharma H.P., Rimal B., Thapa-Magar K., Bhattarai R. and Kunwar R.M. 2021. Characterization and management of human-wildlife conflicts in mid-hills outside protected areas of Gandaki province, Nepal. PLoS ONE, 16(11):e0260307. https://doi.org/10.1371/journal.pone.0260307

Bista R. and Song C. 2022. Human-wildlife conflict in the community forestry landscape: a case study from two Middle Hill districts of Nepal. Human Dimensions of Wildlife, 27(6):554–570. https://doi.org/10.1080/10871209.2022.2046791

Ciocănea C.M., Sorescu C., Ianoși M. and Bagrinovschi V. 2016. Assessing public perception on protected areas in Iron Gates Natural Park. Procedia Environmental Sciences, 32:70–79. https://doi.org/10.1016/j.proenv.2016.03.013

Derebe B., Derebe Y. and Tsegaye B. 2022. Human-wild animal conflict in Banja Woreda, Awi Zone, Ethiopia. International Journal of Forestry Research, 2022: Article ID 1234567. https://doi.org/10.1155/2022/4973392

Frank B., Glikman J.A. and Marchini S. (Eds.) 2019. Human–wildlife interactions: turning conflict into coexistence. Cambridge University Press.

Gore M.L., Knuth B.A., Scherer C.W. and Curtis P.D. 2008. Evaluating a conservation investment designed to reduce human–wildlife conflict. Conservation Letters, 1(3):136–145. https://doi.org/10.1111/j.1755-263X.2008.00017.x

Goswami V.R., Medhi K., Nichols J.D. and Oli M.K. 2015. Mechanistic understanding of human–wildlife conflict through a novel application of dynamic occupancy models. Conservation Biology, 29(4):1100–1110. https://doi.org/10.1111/cobi.12475

Hariohay K.M., Fyumagwa R.D., Kideghesho J.R. and Røskaft E. 2018. Awareness and attitudes of local people toward wildlife conservation in the Rungwa Game Reserve in Central Tanzania. Human Dimensions of Wildlife, 23(6):503–514. https://doi.org/10.1080/10871209.2018.1494866

Kurmi, S.K. and Koju, N.P., 2021. Spatiotemporal association of human-elephant conflict around Parsa National Park, Nepal. Nepalese Journal of Zoology, 5(1), pp.8-12. https://doi.org/10.3126/njz.v5i1.38283

Krejcie, R. V. (1970). Determining sample size for research activities. Educational Psychol Meas.

Linnell J.D.C. and Cretois B. 2018. The revival of wolves and other large predators and its impact on farmers and their livelihood in rural regions of Europe. Research for AGRI Committee, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels. Retrieved from https://coilink.org/20.500.12592/wt8m9d on 21 Jan 2025. COI: 20.500.12592/wt8m9d.

Makindi S.M., Mutinda M.N., Olekaikai N.K., Olelebo W.L. and Aboud A.A. 2014. Human-wildlife conflicts: causes and mitigation measures in Tsavo Conservation Area, Kenya. International Journal of Science and Research (IJSR), 3(6):91–98.

Mekonen S. 2020. Coexistence between human and wildlife: the nature, causes and mitigations of human-wildlife conflict around Bale Mountains National Park, Southeast Ethiopia. BMC Ecology, 20(1):51. https://doi.org/10.1186/s12898-020-00319-1

Mir Z.R., Noor A., Habib B. and Veeraswami G.G. 2015. Attitudes of local people toward wildlife conservation: a case study from the Kashmir Valley. Mountain Research and Development, 35(4):392–400. https://doi.org/10.1659/MRD-JOURNAL-D-15-00030.1

Neupane D., Johnson R. and Risch T. 2017. How do land-use practices affect human–elephant conflict in Nepal? Wildlife Biology, 2017(1):1–9. https://doi.org/10.2981/wlb.00300

Ogra M. 2008. Human–wildlife conflict and gender in protected area borderlands: A case study of costs, perceptions, and vulnerabilities from Uttarakhand (Uttaranchal), India. Geoforum, 39(3):1408–1422. https://doi.org/10.1016/j.geoforum.2007.12.004

Pandey S. and Bajracharya S. 2015. Crop protection and its effectiveness against wildlife: A case study of two villages of Shivapuri National Park, Nepal. Nepal Journal of Science and Technology, 16(1):1–10. https://doi.org/10.3126/njst.v16i1.14353

Pant G., Dhakal M., Pradhan N., Leverington F. and Hockings M. 2016. Nature and extent of human–elephant *Elephas maximus* conflict in central Nepal. Oryx, 50(4):724–731. https://doi.org/10.1017/S0030605315000381

Peterson M., Birckhead J., Leong K., Peterson M. and Peterson T. 2010. Rearticulating the myth of human–wildlife conflict. Conservation Letters, 3(2):74–82. https://doi.org/10.1111/j.1755-263X.2010.00099.x

Pisa L. and Katsande S. 2021. Human Wildlife Conflict in Relation to Human Security in the Gonarezhou National Park, Zimbabwe. International Journal of Earth Sciences Knowledge and Applications, 3(2):98–106.

Poessel S., Breck S., Teel T., Shwiff S., Crooks K. and Angeloni L. 2013. Patterns of human–coyote conflicts in the Denver. The Journal of Wildlife Management, 77:297–305. https://doi.org/10.1002/jwmg.475

Richard D., Emmanuel H., Franco P., Robert D., Machoke N., and Eivin R. 2014. Attitudes of Maasai pastoralists towards the conservation of large carnivores in the Loliondo Game Controlled Area of Northern Tanzania. International Journal of Biodiversity and Conservation, 6(11):797–805. https://doi.org/10.5897/IJBC2014.0746

Sodhi N., Posa M., Lee T., Bickford D., Koh L. and Brook B. 2010. The state and conservation of Southeast Asian biodiversity. Biodiversity and Conservation, 19:317–328. https://doi.org/10.1007/s10531-009-9607-5

Tamrat M., Atickem A., Tsegave D., Nguyen N., Bekele A., Evangelista P. and Stenseth N. 2020. Human–wildlife conflict and coexistence: A case study from Senkele Swayne's Hartebeest Sanctuary in Ethiopia. Wildlife Biology, 2020(3):1–10. https://doi.org/10.2981/wlb.00605

Thapa K. and Kelly M. 2017. Prey and tigers on the forgotten trail: High prey occupancy and tiger habitat use reveal the importance of the understudied Churia habitat of Nepal. Biodiversity and Conservation, 26:593–616. https://doi.org/10.1007/s10531-016-1257-8

Wang J., Damerell P., Shi K., Riordan P., Zhu K., Wang X. and Yang J. 2019. Human-wildlife conflict pattern and suggested mitigation strategy in the Pamirs of northwestern China. Rangeland Ecology and Management, 72(1):210–216. https://doi.org/10.1016/j.rama.2018.08.012

Woodroffe R. and Redpath S. 2015. When the hunter becomes the hunted. Science, 348(6241):1312–1314. https://doi.org/10.1126/science.aaa8465