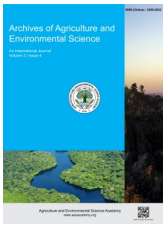
Archives of Agriculture and Environmental Science 11(1): 36-42 (2026)
https://doi.org/10.26832/24566632.2026.110106

e-ISSN: 2456-6632

This content is available online at AESA

Archives of Agriculture and Environmental Science

Journal homepage: journals.aesacademy.org/index.php/aaes



ORIGINAL RESEARCH ARTICLE

Human-wolf conflicts in the Buffer zone of Sagarmatha National Park: Patterns of Livestock predation, Community Perceptions and mitigation strategies

Indra Kumar Upadhyay, Vijay Kumar Yadav*, Shreeshiv Poudel, Punit Yadav, and Bishow Banjade

Institute of Forestry, Tribhuvan University, Hetauda Campus, Hetauda 44100, Nepal
*Corresponding author's E-mail: vijay.yadav@hc.tu.edu.np

ARTICLE HISTORY

Received: 05 December 2025
Revised received: 16 February 2026
Accepted: 25 February 2026

Keywords

Human-wildlife conflict
Mitigation
Sagarmatha
Wolf depredation

ABSTRACT

In the buffer zone of Sagarmatha National Park, Nepal, this study assessed the status of human–wolf conflict by documenting livestock depredation patterns, exploring community perceptions, and reviewing locally applied mitigation measures. Information was gathered through reconnaissance and key-informant consultations, field visits to reported conflict locations (supported by signs such as tracks, scat, and carcass remains), and household interviews using open-ended questionnaires with 132 respondents from Ward 4 and Ward 5 (66 per ward). Reported conflict was widespread: 75% of respondents perceived an increasing trend in wolf population over the last five years, and 41.7% described wolf attacks as frequent. Annual livestock depredation records from 2019 to 2025 indicated that wolves were the principal predator, accounting for 1,277 incidents (approximately 87.5% of all recorded depredations). The highest number of cases occurred in 2024/25 (339), while the lowest number was recorded in 2020/21 (102). Among respondents who identified seasonal patterns (n = 77), attacks were reported most frequently during the summer (June–August; 47%) and occurred primarily in the evening (42%) and at night (35%). Perceptions were predominantly negative, driven by livestock losses (68.2%) and concerns for human safety (27.3%). Fencing, sensor lights, and fox lights were used by some households, but many reported no preventive measures and generally viewed existing options as ineffective. Education and direct encounters with wolves were significantly associated with perceptions and support for wolf conservation. Targeted, community-led prevention and risk-communication efforts aligned with local depredation patterns could reduce losses while maintaining support for wolf conservation.

Citation of this article: Upadhyay, I. K., Yadav, V.K., Poudel, S., Yadav, P., & Banjade, B. (2026). Human-wolf conflicts in the Buffer zone of Sagarmatha National Park: Patterns of Livestock predation, Community Perceptions and mitigation strategies. *Archives of Agriculture and Environmental Science*, *11*(1), 36-42, https://dx.doi.org/10.26832/24566632.2026.110106

INTRODUCTION

Human-wildlife conflict (HWC) refers to situations where interactions between humans and wildlife result in negative consequences for human livelihoods, wildlife populations, or both (Redpath *et al*., 2013; Joshi *et al*., 2022). Such conflicts typically occur when wildlife damages crops, preys on livestock, or threatens human safety, while people retaliate by killing or displacing animals. This issue has become one of the most pressing challenges in conservation worldwide, particularly in landscapes where human settlements overlap with wildlife habitats (Treves & Karanth, 2003). Among large carnivores, wolves (*Canis lupus*) are one of the most widespread conflict-prone species. Their ecological role as apex predators is critical for regulating prey populations and maintaining ecosystem balance, yet their tendency to prey on livestock often places them in direct conflict with pastoral communities (Mech & Boitani, 2010). Globally, human-wolf conflicts are reported from North America, Europe, Central Asia, and South Asia. In the United States, for example, gray wolves have long been at the center of debates between ranchers and conservationists, leading to the establishment of compensation schemes and wolf recovery programs (Bangs

et al., 1998). In Europe, countries such as Spain, Italy, and Poland continue to face tensions as expanding wolf populations prey on sheep and cattle (Chapron *et al.*, 2014). In Mongolia and China, Himalayan and Tibetan wolves frequently target herds of yak, goats, and sheep, intensifying challenges for pastoralists who depend almost entirely on livestock for subsistence (Suryawanshi *et al.*, 2013). These global examples highlight that human-wolf conflict is not merely an ecological issue but also a socio-economic and cultural challenge requiring context-specific solutions.

In South Asia, and particularly in Nepal, the problem is acute due to the heavy dependence of rural households on subsistence livestock rearing (Oli *et al.*, 1994; Raza *et al.*, 2024). The Himalayan wolf (*Canis lupus chanco*), a genetically distinct lineage adapted to high-altitude ecosystems, inhabits areas above 3,500 meters in Nepal, including Sagarmatha National Park (SNP) and its buffer zones (Chetri *et al.*, 2017; Werhahn *et al.*, 2018; Subedi *et al.*, 2025). Livestock, mainly yaks, goats, and sheep, are central to local livelihoods, providing milk, meat, wool, and draught power. These animals are grazed in alpine meadows and forests that also constitute wolf habitats, thereby increasing the probability of encounters. Consequently, livestock depredation has emerged as a pressing concern, directly undermining household economies and shaping negative perceptions of wolves (Chetri *et al.*, 2020). The impacts of wolf predation are profound. Even the loss of a few animals can impose severe economic strain on households, given the limited income sources available in high-altitude settlements (Raza *et al.*, 2024). Beyond financial loss, predation influences community attitudes toward wolves, often fueling resentment and retaliatory killings through poisoning, trapping, or hunting. This, in turn, threatens already vulnerable wolf populations in Nepal, where conservation attention has historically focused more on species such as snow leopards (*Panthera uncia*) and tigers (*Panthera tigris*) (Aryal, 2020).

Patterns of wolf predation in Nepal are shaped by multiple ecological and human-related factors. Ecological variables such as prey abundance, terrain ruggedness, vegetation cover, and seasonality determine when and where wolves attack livestock (Suryawanshi *et al.*, 2013; Chetri *et al.*, 2020; Ojha *et al.*, 2023). For example, predation rates often rise during harsh winters or periods of wild prey scarcity, when wolves increasingly target domestic animals. Human practices also play a critical role in herding systems, grazing routes, the strength of corrals, and settlement proximity all of which influence the vulnerability of livestock (Shrestha *et al.*, 2018). These complex interactions highlight the need for detailed, site-specific research that integrates ecological data with socio-economic realities.

Community perceptions toward wolves in Sagarmatha's buffer zone are strongly shaped by these livelihood pressures. While some individuals recognize wolves' ecological role, negative perceptions dominate, especially in households with high livestock losses (Werhahn *et al.*, 2018). Existing mitigation strategies, such as traditional guarding, predator-proof corrals, and awareness programs, are limited by financial constraints, harsh geography, and weak institutional frameworks (Chetri *et al.*, 2017). Without stronger and more inclusive mitigation approaches, hostility toward wolves is likely to deepen, undermining conservation objectives. Despite increasing recognition of human-wolf conflict as a conservation issue, research on this subject in Nepal remains scarce (Aryal, 2020). Most existing work has concentrated on more charismatic carnivores, leaving Himalayan wolves understudied. Critical knowledge gaps persist regarding the temporal and spatial patterns of livestock predation, the socio-economic impacts on herder communities, and the effectiveness of current mitigation measures. Furthermore, there is a lack of clear policy frameworks specifically addressing wolf conservation in Nepal, which complicates long-term management strategies. This study, therefore, aims to address these gaps by investigating human-wolf conflict in the buffer zone of Sagarmatha National Park. Specifically, it seeks to examine patterns of livestock predation and identify ecological and human-related factors influencing these patterns, to assess community perceptions and attitudes toward wolves, with a focus on the socio-economic impacts of predation and to identify and evaluate existing mitigation strategies, exploring their effectiveness and limitations in reducing conflict. By integrating ecological and social perspectives, this study will contribute to a more comprehensive understanding of human-wolf interactions in high-altitude Nepal. The findings will not only advance scientific knowledge of predator-prey-human dynamics but also provide practical recommendations for conservation policy and community-based conflict management. Ultimately, the study aims to promote coexistence between wolves and pastoral communities in the Sagarmatha region, ensuring the survival of a unique carnivore lineage while safeguarding local livelihoods.

MATERIALS AND METHODS

Study area

This study was conducted in Sagarmatha National Park (Figure 1), situated in the northeastern mountain region of Nepal, covering an area of 1148 km2 and a buffer zone of 275 km2 gazette in 2002 in the Solukhumbu District. It was declared a World Natural Heritage Site in 1979 and is the world's highest altitude protected area. This northern mountainous park is situated between 27045'- 28007'N latitude and 86028'- 87007'E longitudes (SNP, 2016). The outstanding features of the park are its majestic peaks higher than 8,000 m, including Sagarmatha (8,848 m), Lhotse (8,501 m), and Cho Oyu (8,188 m). The terrain is steep and rugged and broken by the deep river gorges below, while there are glaciers and glacial valleys at the upper reaches. (SNP Management Plan, 2016-2020). The climatic zones range from lower alpine to nival (Balestrini *et al.*, 2014). The Sherpas have inhabited the region for the last four centuries and account for over 6000 individuals in about 20 villages. The natural and cultural environments are the major pull factors for visitors. This elevational gradient supports a diverse array of ecosystems, ranging from lower-elevation pine and hemlock forests to higher -elevation Abies, juniper, Betula, *Pinus*, *R. campanulatum*, and *R. campylocarpum* as alpine communities (Subedi & Bashyal, 2022;

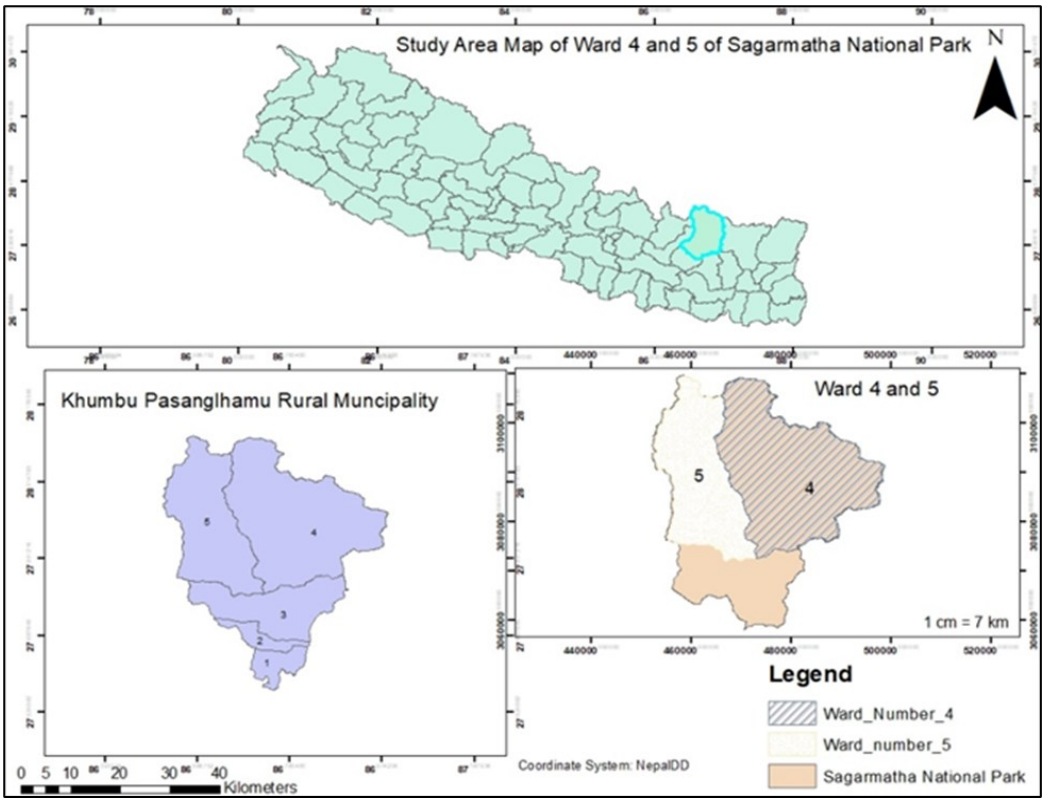


Figure 1. *Map showing the study area.*

Gupta, 2024). It is home to more than 118 bird species, including red pandas (*Ailurus fulgens*), snow leopards (*Panthera uncia*), musk deer (Moschus), Himalayan tars (*Hemitragus jemlahicus*), and impedance pheasants.

Data collection

Reconnaissance survey: It was carried out through discussion with park authorities, biologists, and experts to initiate the detailed field survey and to identify potential places of human-wolf conflict. The geographic locations of those places were recorded by using a Global Positioning System (GPS) with the WGS 84 geographic coordinate system, with an accuracy of at least 5 m.

Interview procedure for livestock depredation record: Key Informants Interviews with Senior citizens, Sagarmatha National Park staff, trekking guides, buffer zone user group committee, etc., were carried out to discuss the trend of human wildlife conflict in the study area. All shepherd teams were brought together for interviews, during which we obtained information on the types and quantities of livestock under their care for grazing in both the summer and winter seasons.

Field survey: It was done with field assistance and park staff. It was carried out in areas such as open pastures, livestock shelters, and grazing fields where wolf predation on livestock occurred. To examine predation trends, indicators such as wolf tracks, scat, and body remains were documented. To better understand the spatial distribution of wolf attacks, these observations were used to cross-check interview data.

Questionnaire survey for conflict mitigation measures: During the surveys, pre-designed questionnaires having open-ended questions were used to collect responses of the respondents (Din *et al.*, 2013). Questionnaire surveys are considered an important tool to gather information about the presence, tolerance, and perception of local communities towards the wildlife species present in an area (White *et al.*, 2005). We conducted interviews on strategies to mitigate human-wolf conflict and public demands (Ambarli, 2019). Thus, interviews of 66 randomly selected respondents from each ward were conducted, and attendance of local elders and local wildlife guards was ensured to avoid false information.

Data analysis

The data analysis was done by both qualitative and quantitative methods. All the information was assembled in semi-structured forms, photographs, and interviews. The data collected from the field was verified and fixed as per the objectives. After data categorization and data entry, further analysis was done by using R Studio (R core team, 2022). The information is shown using charts and graphs.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

One hundred thirty-two individuals participated in the survey, with equal representation from Ward 4 (n = 66) and Ward 5 (n = 66). Of the total respondents, 57 (43.2%) were male, and 75 (56.8%) were female. Most respondents were between the ages of 30 to 50, with 39 individuals (29.5%) aged 30-40 and 30 individuals (22.7%) aged 40-50 (Table 1). The Sherpa community constituted the majority (n = 103, 78%) ethnic group, while the remaining respondents belonged to other ethnic communities like Tamang (n = 6), Gurung (n = 4), and Magar (n = 3). More than

Table 1. Demographic characteristics of respondents.

Demographic Variable	Category	Ward 4 (n = 66)	Ward 5 (n = 66)	Total (n = 132)
Gender	Male	23	32	57
	Female	43	34	75
Age	<20	1	0	1
	20-30	6	10	16
	30-40	25	14	39
	40-50	15	15	30
	>50	19	27	46
Ethnicity	Sherpa	46	62	103
	Others	20	4	29
Education	Illiterate	32	38	70
	Primary	25	22	47
	Secondary	9	6	15
Occupation	Agriculture	5	29	34
	Livestock Rearing	34	8	42
	Tourism	24	23	47
	Others	3	6	9

half respondents were illiterate (n = 70, 53%), while 47 (35.6%) respondents had attained primary level education, and the remaining with secondary level education. As the area was a tourist destination, 47 individuals were engaged in any form of tourism (Hotel, Guides, Porters, etc.), and other major occupations were livestock rearing (n = 42, 31.8%) and agriculture (n = 34, 25.8%). The average annual income of the respondents was approximately NRs. 500000 ($ 3660). Most households raised yaks, with other commonly reared livestock including jokpe and horses.

Status of human-wolf conflict

The human-wolf conflict is a pressing issue in the region, with frequent interactions between local communities and wolves, which often lead to livestock depredation. These incidents have contributed to a negative attitude towards the species. In this section, we describe the frequency, causes, and temporal pattern of wolf attacks.

Frequency and trend of human-wolf conflict

Most respondents mentioned that the wolf attack occurred frequently (n = 55; 41.7%), while 40 individuals (30.3%) stated that the attacks occurred rarely (Figure 2a, b). 99 respondents (75%) noticed an increasing trend in the wolf population over the last five years. This is evident in the increase in the number of livestock predations by wolves over the last decade (Figure 3). We collected annual livestock predation data from 2019 to 2025, and we see an increasing trend. Wolf is the major predator, with over 1277 cases of livestock predation, which is approximately 87.5% of the total cases. 2024/25 showed the highest number of cases with 339, while 2020/21 had the fewest cases with 102. The findings from this study reveal a marked escalation in livestock predation incidents attributed primarily to wolves in the study area from 2019 to 2025, with a total of over 1,277 cases comprising approximately 87.5% of all recorded depredations. This increasing trend, peaking at 339 cases in 2024/25 and dipping to a low of 102 in 2020/21, underscores the growing intensity of human-wolf conflicts in Nepal's high-altitude regions. Such patterns align with broader regional dynamics observed in the Himalayas and trans-Himalayas, where anthropogenic pressures exacerbate wildlife-livestock interactions. For instance, similar exponential increases in depredation have been documented in Bardia National Park, where leopard attacks on livestock rose dramatically from a low of 8 kills in 2006 to a high of 500 in 2020 (Dhungana *et al.*, 2019; Subedi *et al.*, 2022c). While leopards dominate in lowland Terai ecosystems, the dominance of wolves in our study mirrors findings from Kargil, Ladakh, where wolves accounted for 43.6% of 1,113 livestock kills between 2009 and 2012-the highest proportion among predators, surpassing snow leopards at 21.5% (Maheshwari & Sathyakumar, 2020; Ghimire *et al.*, 2022). This plurality highlights wolves as key conflict drivers in open pastoral landscapes, particularly where wild prey depletion forces greater reliance on domestic animals, as evidenced by dietary analyses showing wolves deriving substantial biomass from livestock in trans-Himalayan India (Werhahn *et al.*, 2019; Khadka *et al.*, 2023; Devkota *et al.*, 2025a). Comparable escalations are reported across the Himalayas, driven by larger herd sizes and persistent depredations, as seen in Bhutan's Wangchuck Centennial National Park (Jamtsho & Wangdi, 2019).

Temporal pattern of human wolf conflict

77 respondents knew the temporal pattern of human wolf conflict and responded to the questions. Most of these respondents (n = 36; 47%) mentioned that the wolf attack occurred during summer months from June to August, followed by the winter season from December to February (Figure 4a). Similarly, 32 individuals (42%) of the respondents stated that the wolf attack occurred in the evening, while 27 respondents (35%) mentioned that the attack mainly occurred during the night (Figure 4b). Temporal patterns in wolf depredations provide additional insights into conflict dynamics, with 47% of respondents (n=36 out of 77) identifying summer months (June–August) as the primary period, followed by winter (December–February). This seasonal bias is also found in study conducted by (Ramsay *et al.*, 2017; Werhahn *et al.*, 2019; Bhattarai *et al.*, 2025) from livestock migrations to high-altitude pastures during summer, coinciding with wolf denning and pup-rearing. Diurnally, evening (42%, n=32) and night (35%, n=27) emerged as peak attack times, aligning with wolves' nocturnal foraging behaviors to evade human detection (Pal *et al.*, 2022; Werhahn *et al.*, 2019; Subedi *et al.*, 2022b).

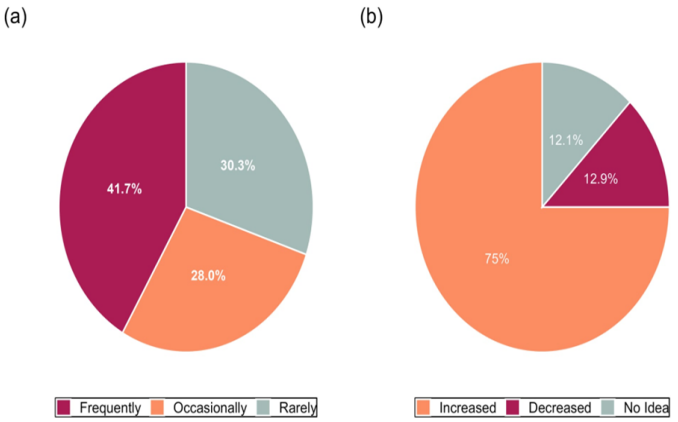


Figure 2. *(a) Frequency of human-wolf conflict (b): Statu of human-wolf conflicts.*

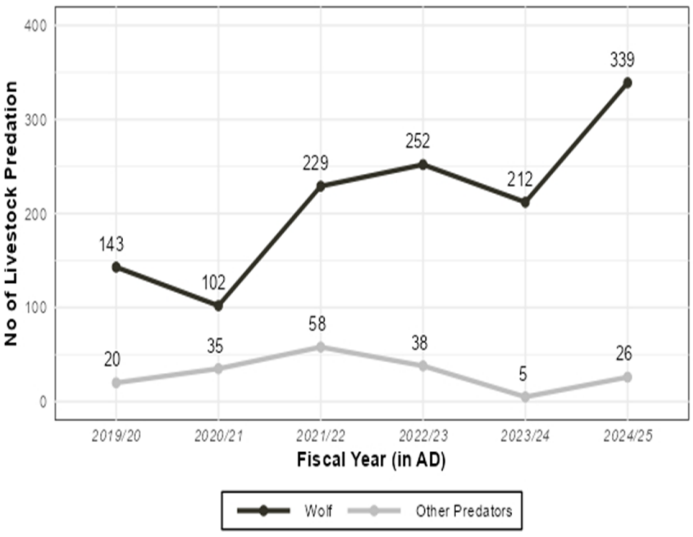


Figure 3. *Number of livestock predation by wolves and other predators.*

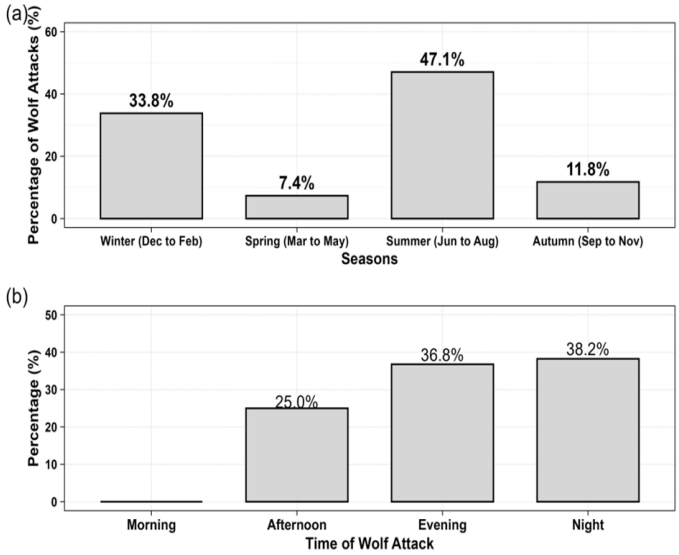


Figure 4. *(a) Percentage of wolf attacks in each season (b): Time of wolf attacks.*

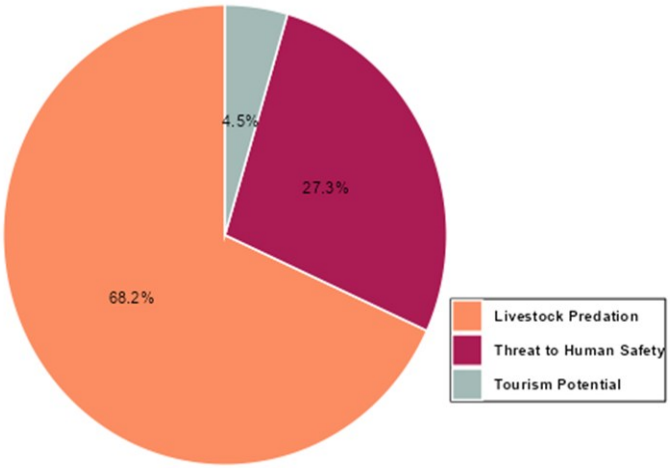


Figure 5. *Concern of people regarding HWC.*

People's perception of wolves and their conservation

We asked the respondents what their main concern regarding wolves was. 68.2% of the respondents feared the wolf due to livestock predation, while 27.3% of them feared their lives due to wolf attack, and the remaining 4.8% had a positive opinion about wolves as they boost tourism (Figure 5). Local perceptions of wolves were predominantly negative, with 68.2% of respondents fearing depredation impacts on livestock and 27.3% expressing concerns for personal safety, while only 4.8% viewed wolves positively for their tourism potential. This fear-driven antagonism echoes sentiments in Spiti Valley, India, where over 98% of respondents held negative views tied to economic losses (SL & BH, 2019), and in Nepal's Himalayas, where wolves elicited stronger hostility than snow leopards despite comparable damages (Raza *et al.*, 2024; Dahal *et al.*, 2025; Subedi *et al.*, 2022a). To prevent human-wolf conflict, respondents employed various preventive measures, including fencing, sensor lights, and Fox lights. Fencing was the most used method, adopted by 51 respondents, followed by Sensor light (n = 22) and Fox light (n = 19). Likewise, 49 respondents reported not using any preventive measures and would generally inform authorities after sightings of wolves. Despite the number of preventive measures, respondents believe the measures are not effective in preventing human-wolf conflict (Figure 6a, b). Preventive measures adopted by respondents, including fencing (n=51), sensor lights (n=22), and Fox lights (n=19), reflect proactive efforts, yet 49 respondents reported no measures, opting instead to inform authorities post-sighting. Similarly, Fox lights provided short-term relief but required sustained application. In Nepal's central Himalayas, improved corrals and electric fencing are recommended, though variable adoption and poor practices limit success (Chetri *et al.*, 2020; Farrington & Tsering, 2020; Devkota *et al.*, 2025b). There was a significant association between the education level of respondents and perception of wolves (X^2= 14.227, df =4, p = 0.0066) as well as need for wolf conservation (X^2 = 14.05, df = 2, p = 0.00088). We tried to understand if encountering a wolf personally would affect their perception of wolf conservation. The chi-square test showed that there was a significant association between encountering a wolf and the need for conservation (X^2 = 8.1632, df = 1, p = 0.004). People who encountered wolves were generally against wolf conservation and vice versa.

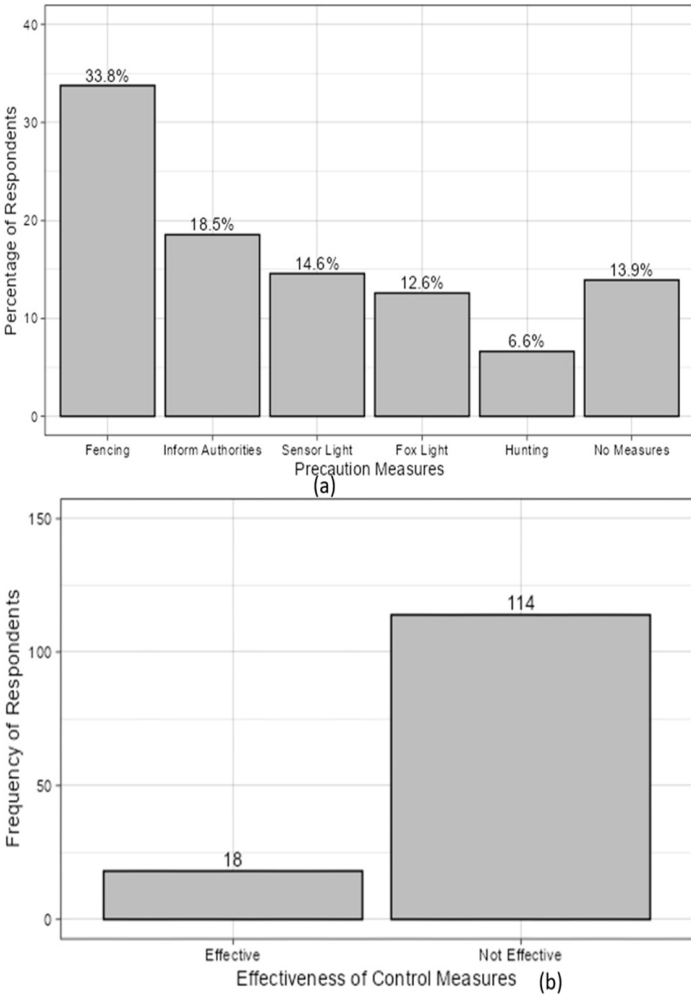


Figure 6. *(a) Protection measures applied to stop HWC. (b): People's perception of the effectiveness of applied measures.*

Conclusion

This study shows that human–wolf conflict in the Sagarmatha National Park buffer zone is intensifying, with wolves responsible for the majority of recorded livestock depredation between 2019 and 2025. Community reports indicate that attacks are perceived as increasingly frequent, occur most often in summer, and are concentrated in evening and night hours-time that shape herding risk and the feasibility of protection. Negative attitudes toward wolves are widespread and largely tied to livelihood impacts, while only a small proportion of respondents view wolves positively. Although some households reported using fencing and light-based deterrents, many respondents either apply no preventive measures or consider current measures ineffective. The significant associations between education, wolf encounters, and conservation support suggest that responses to conflict should combine practical protection with targeted outreach that is sensitive to lived experience and local constraints. Continued, systematic documentation of depredation events alongside community-based monitoring would strengthen understanding of where and when risks are highest and help evaluate which mitigation options are most workable under Sagarmatha's environmental and social conditions.

DECLARATIONS

Author contribution statement: Conceptualization: I.K.U., V.K.Y., and B.B; Methodology: I.K.U, V.K.Y; Software and validation: I.K.U., S.P, and P.Y; Formal analysis and investigation: S.P; Resources: X.X.; Data curation: X.X.; Writing—original draft preparation: X.X.; Writing—review and editing: V.K.Y., P.Y., and B.B; Visualization: S.P.; Supervision: V.K.Y. All authors have read and agreed to the published version of the manuscript.

Conflicts of interest: The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

Ethics approval: This study was conducted by following the ethical guidelines on survey studies of the institute.

Consent for publication: All co-authors gave their consent to publish this paper in AAES.

Data availability: The data that support the findings of this study are available on request from the corresponding author.

Supplementary data: No supplementary data is available for the paper.

Funding statement: Not applicable.

Additional information: No additional information is available for this paper.

REFERENCES

Ambarli, H. (2019). Analysis of wolf–human conflicts: Implications for damage mitigation measures. *European Journal of Wildlife Research*, 65(6), 81.

Aryal, S. (2022). *Status of Human-Wildlife Conflict in Manahari Buffer Zone Area of Parsa National Park: A Geospatial Approach to Assess the Conflict* (Doctoral dissertation, Thesis submitted for the partial fulfillment of the award of M. Sc. in Natural Resource Management and Rural Development, KAFCOL, Tribhuvan University, Kathmandu, Nepal).

Balestrini, R., Polesello, S., & Sacchi, E. (2014). Chemistry and isotopic composition of precipitation and surface waters in Khumbu valley (Nepal Himalaya): N dynamics of high elevation basins. *Science of the Total Environment*, 485, 681-692.

Bangs, E. E., Fritts, S. H., Fontaine, J. A., Smith, D. W., Murphy, K. M., Mack, C. M., & Niemeyer, C. C. (1998). Status of gray wolf restoration in Montana, Idaho, and Wyoming. *Wildlife Society Bulletin*, *26*(4), 785-798.

Bhattarai, D., Devkota, A., & Sharma, G. B. (2025). Determinants and perceptions of women's participation in community forest management: Evidence from Western Nepal. *Archives of Agriculture and Environmental Science*, *10*(4), 615-624. https://doi.org/10.26832/24566632.2025.100409

Chapron, G., Kaczensky, P., Linnell, J. D., Von Arx, M., Huber, D., Andrén, H., & Boitani, L. (2014). Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science*, *346*(6216), 1517-1519. https://doi.org/10.1126/science.1257553

Chetri, M., Odden, M., & Wegge, P. (2017). Snow leopard and Himalayan wolf: food habits and prey selection in the Central Himalayas, Nepal. *PloS one*, *12*(2), e0170549. https://doi.org/10.1371/journal.pone.0170549

Chetri, M., Odden, M., Devineau, O., McCarthy, T., & Wegge, P. (2020). Multiple factors influence local perceptions of snow leopards and Himalayan wolves in the central Himalayas, Nepal. *PeerJ*, *8*, e10108. https://doi.org/10.7717/peerj.10108

Dahal, R. P., Kafle, S., Khanal, K., KC, S., Subedi, M., Ojha, P., & Din, H. U. (2025). Agroforestry and traditional knowledge: Lessons from indigenous practices in South Asian Countries: A review. *Archives of Agriculture and Environmental Science*, *10*(1), 189-196. https://doi.org/10.26832/24566632.2025.1001027

Devkota, A., Karki, B., Magar, L. K., & Lamichhane, P. (2025a). Assessing the impact of canopy opening in regeneration status of tropical Terai forest of Nepal. *Trees, Forests and People*, 100904. https://doi.org/10.1016/j.tfp.2025.100904

Devkota, A., Upadhyay, I. K., & Wagle, B. (2025b). Value chain analysis of Taxus (Yew) species and its affecting factors in Makwanpur district, Nepal. *Archives of Agriculture and Environmental Science*, *10*(4), 677-686. https://doi.org/10.26832/24566632.2025.1004017

Dhungana, R., Ram, B., Savini, T., Dhakal, M., Sagar, B., & Bahadur, J. (2019). Livestock depredation by leopards around Chitwan National Park, Nepal. *Mammalian Biology*, *96*, 7–13. https://doi.org/10.1016/j.mambio.2019.03.006

Din, J. U., Hameed, S., Shah, K. A., Khan, M. A., Khan, S., Ali, M., & Nawaz, M. A. (2013). Abundance of canids and human canid conflict in the Hindu Kush Mountain range of Pakistan. *Wildlife Biology in Practice*, 9(2), 20-29.

Farrington, J. D., & Tsering, D. (2020). Snow leopard distribution in the Chang Tang region of Tibet, China. *Global Ecology and Conservation*, *23*(4), e01044. https://doi.org/10.1016/j.gecco.2020.e01044

Ghimire, A., Paudel, S., & Devkota, A. (2022). Silvicultural Systems in the Restoration of Normal Forest: A Review. *Forestry: Journal of Institute of Forestry, Nepal*, *19*(01), 64-72. https://doi.org/10.3126/forestry.v19i01.55706

Gupta, A. (2024). Analyzing Land Use/Land Cover Dynamics in Mountain Tourism Areas: A Case Study of the Core and Buffer Zones of Sagarmatha and Khaptad National Parks, Nepal. *Sustainability*, 16(23), 10670.

Joshi, H. C., Ojha, P., Khadka, S., & Adhikari, S. (2022). An Assessment of Human-Wildlife Conflict in Basanta Corridor: a Case Study from Kailari Rural Municipality, Nepal. *Indonesian Journal of Social and Environmental Issues (IJSEI)*, *3*(3), 213-222. https://doi.org/10.47540/ijsei.v3i3.635

Khadka, S., Ojha, P., Yadav, V. K., Rijal, P., Joshi, H., & Acharya, K. R. (2023). Public Perception and Institutional Involvement in Urban Forestry Development in Dhangadhi Sub-Metropolitan City, Sudurpaschim Province, Nepal. *Forestry: Journal of Institute of Forestry, Nepal*, *20*(1), 95-111. https://doi.org/10.3126/forestry.v20i1.64340

Mech, L. D., & Boitani, L. (2010). *Wolves: Ecology, behavior, and conservation*. University of Chicago Press.

Pal, R., Panwar, A., Goyal, S.P., & Sathyakumar, S. (2022). Space Use by Woolly Wolf *Canis lupus chanco* in Gangotri National Park, Western Himalaya, India. *Frontier in Ecology and Evolution*, *9*: 782339. https://doi.org/10.3389/fevo.2021.782339

Raza, M., Namgail, T., & Rawat, G. S. (2024). Livestock Depredation by Large Carnivores in Kargil, Indian Trans-Himalaya: Patterns and People's Perceptions. *Indian Journal of Ecology*, *51*(4), 727-731.

Ojha, P., Acharya, K. R., Subedi, A., & Regmi, S. (2023). Impact of silviculture system on regeneration status and species diversity: reflection from far-western lowland, Nepal. *Banko Janakari*, *33*(2), 24-37. https://doi.org/10.3126/banko.v33i2.58280

Oli, M. K., Taylor, I. R., & Rogers, M. E. (1994). Snow leopard Panthera uncia predation of livestock: an assessment of local perceptions in the Annapurna Conservation Area, Nepal. *Biological Conservation*, *68*(1), 63-68.

Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., ... & Gutierrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology & Evolution*, *28*(2), 100-109.

Shrestha, B., Aihartza, J., & Kindlmann, P. (2018). Diet and prey selection by snow leopards in the Nepalese Himalayas. *PLoS One*, *13*(12), e0206310. https://doi.org/10.1371/journal.pone.0206310

SNP. (2016). Sagarmatha national park and its buffer zone management plan 2016 -2020. Sagarmatha National Park (SNP).

Subedi, A., & Bashyal, B. (2022). Medicinal properties and uses of *Aegle marmelos* (Bel) plant: A review. *Asian Journal of Pharmacognosy*, *6*(1), 10-20.

Subedi, A., Ojha, P., Poudel, U., & Yadav, S. K. (2025). Effectiveness of salt licking sites for wild animals in Bardia National Park, Nepal. *Archives of Agriculture and Environmental Science*, *10*(4), 644-651. https://doi.org/10.26832/24566632.2025.1004012

Subedi, A., Shrestha, P., & Ojha, P. (2022c). Status, Distribution, and Threats of Red Panda (*Ailurus fulgens* Cuvier, 1825) in Nepal. *Indonesian Journal of Social and Environmental Issues (IJSEI)*, *3*(3), 233-240. https://doi.org/10.47540/ijsei.v3i3.688

Subedi, P. B., Ojha, P., Adhikari, A., Acharya, S., & Acharya, S. (2022a). Mapping of major land use Land cover dynamics and its driving factors: A case study of Nepalgunj Sub-Metropolitan City, Banke, Nepal. *Indonesian Journal of Social and Environmental Issues (IJSEI)*, *3*(1), 67-80. https://doi.org/10.47540/ijsei.v3i1.468

Subedi, P. B., Ojha, P., Mahara, S., & Gautam, D. (2022b). Assessment of rate and drivers of deforestation and forest degradation in the lower-tropical region: a case of Punarbas Municipality, Nepal. *Our Nature*, *20*(1), 27-40. https://doi.org/10.3126/on.v20i1.44789

Treves, A., & Karanth, K. U. (2003). Human□carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology*, *17*(6), 1491-1499.

Suryawanshi, K. R., Bhatnagar, Y. V., Redpath, S., & Mishra, C. (2013). People, predators and perceptions: patterns of livestock depredation by snow leopards and wolves. *Journal of Applied Ecology*, *50*(3), 550-560. https://doi.org/10.1111/1365-2664.12061

Werhahn, G., Senn, H., Ghazali, M., Karmacharya, D., Sherchan, A. M., Joshi, J., ... & Macdonald, D. W. (2018). The unique genetic adaptation of the Himalayan wolf to high-altitudes and consequences for conservation. *Global Ecology and Conservation*, *16*, e00455.

Werhahn, G., Kusi, N., Li, X., Chen, C., Zhi, L., & Raquel, L. (2019). Himalayan wolf foraging ecology and the importance of wild prey. *Global Ecology and Conservation*, *20*. https://doi.org/10.1016/j.gecco.2019.e00780

White, P. C., Jennings, N. V., Renwick, A. R., & Barker, N. H. (2005). Questionnaires in ecology: a review of past use and recommendations for best practice. *Journal of Applied Ecology*, *42*(3), 421-430.