Dimensions of human–tiger conflict and solutions for coexistence in forests of the Khata Corridor, Bardiya, Nepal

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SUPPLEMENTARY MATERIAL 1 Data sheet used for household survey, containing detailed demographic and socio-economic information about the respondents, their patterns of forest visitation, and observations concerning spatial-temporal tiger activity within human habitats.

A. Demographic and socio-economic information

House no:	GPS location: X…….. Y……
Name:	
Address:	
Age:	
Sex:	
Religion:	
Marital status:	
Education:	
Family size:	
Monthly family income (in Nepali rupees):	
Livestock status (in numbers):	
Adult cow/buffalo	Calf cow/buffalo Goat/sheep

B. Forest and people

Distance from house to the forest edge?	……m (air distance)			
Do you go to the forest? Y/N, if yes	Daily	Weekly	Monthly	Yearly
At which season do you go to the forest? (check all that applies)	Winter	Spring	Summer	Autumn
At what time do you go to the forest? (check all that applies)	Morning	Day	Evening	Night
For what purpose do you go to the forest?				
How much time do you spent in the forest per day?	…… hours			
Do you go forest to collect fodder/firewood?	Yes		No	
Do you graze animal in forest openly?	Yes		No	
House surroundings condition	Open		Closed	

Livestock shed condition	Open	Closed

C. Tiger and people

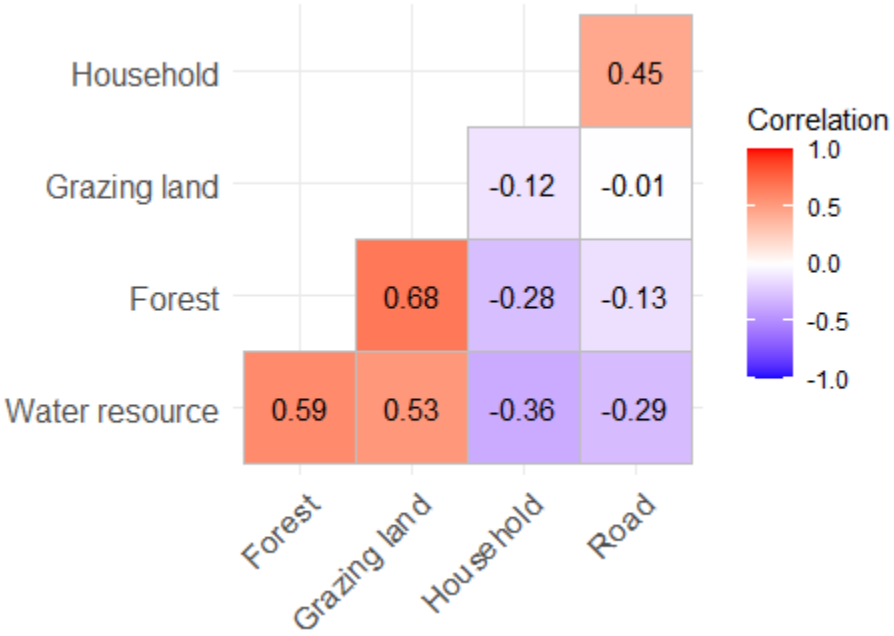
Have you ever seen tigers wandering in your village in recent 5 years?	Yes		No	
At which season they wanders mostly? (rank them in order)	Winter	Spring	Summer	Autumn
At what time they wanders mostly? (rank them in order)	Morning	Day	Evening	Night
How many times have you seen tigers in your village?	Once	Twice	Thrice	Multiple
Have you, your family members, neighbors and livestock's were attacked or killed by tigers in recent 5 years?	Yes		No	
At which season tiger attacked?	Winter	Spring	Summer	Autumn
At what time tiger attacked?	Morning	Day	Evening	Night
How many times tiger attacked?	Once	Twice	Thrice	Multiple
Where have you seen tiger? Or, where did tiger attacked? (habitat type and GPS)	Habitat type:…… X…….Y ……..			
Distance from tiger sighting point to the nearby forest (m)				
Distance from tiger sighting to the nearby grazing land (m)				
Distance from tiger sighting to the nearby water resources (m)				
Distance to the tiger sighting to the nearby household (m)				
Distance to the tiger sighting to the nearby roads (m)				

SUPPLEMENTARY TABLE 1 List of variables used in both multinomial and binary logistic regression models.

Variables (codes)	Description
A. Both	
Human settlement (hs)	Respondents were recorded as living in one of four settlements, including Thakurdwara, Neulapur, Dalla, and Pattharbhuji
B. Multinomial logistic regression	
Forest visitation pattern (fvp)	Reflects household survey responses on frequency of forest visitation as Daily (frequent), Weekly, Monthly and Yearly (rare) visitation. Forest visitation indicates respondents visit to any forest nearby their settlements including community forest, buffer-zone forest, national forest, and National Park.
Age of respondent (age)	Reflects age class of primary information giver during household surveys as early-age adults (19-34 years old), middle-age adult (35-49 years old), and late-age adults (≥50 years old).
Gender of respondent (sex)	Gender of the respondent was either Male or Female
Livestock herd size (ls)	A measure of the total number of livestock possessed by respondent's household. Livestock includes cows, buffalo and goats. Head count includes juveniles < 3 months old with mother as 1 head. Head count is Low (0-4 animals) or High (>4)
Monthly income (mi)	Reflects total earnings made by respondent family per month, as Low (<15,000 Nepalese Rupees) or High (>15,000 Nepalese Rupees). Exchange rate, 1 USD = ~120 Nepalese Rupees during field visit.
C. Binary logistic regression	
Presence/pseudo-absence of tigers based on sightings (pa)	Presence reflects a tiger sighting within the boundaries of a human settlement, including forest edge, while absences are randomly generated locations within the same settlement boundaries using ArcGIS.
Distance to the forest (f)	It measures a shortest distance from presence and pseudo-absence locations of tiger sightings to any nearest forest boundary within the settlement area.
Distance to the grazing land (gl)	It measures a shortest distance from presence and pseudo-absence locations of tiger sightings to nearest grazing land within the settlement area.
Distance to the water resources (wr)	It measures a shortest distance from presence and pseudo-absence locations of tiger sightings to nearest water resources (river, ponds, irrigation channel, etc.) within the settlement area.
Distance to the household (hd)	It measures a shortest distance from presence and pseudo-absence locations of tiger sightings to nearest household within the settlement area.

Distance to the household (r)	It measures a shortest distance from presence and pseudo-absence locations of tiger sightings to nearest roads or wide foot trails within the settlement area.

SUPPLEMENTARY MATERIAL 2 Data used for multinomial logistics regression and binary logistics regression. Detail description of variables used for both tests are provided in Supplementary Table 1. For multinomial test, the dependent categorical variable consisted of frequency of forest visitations (fvp) at four levels (daily, weekly, monthly, and yearly) and the independent categorical variables included human settlement (hs) (each of the four focal settlements), gender of respondent (sex) (male or female), age (early-age adults as 19-34 years old, middle-age adults as 35-49 years old, and late-age adults as ≥50 years old), monthly family income (mi) of each household (low as <15,000 Nepalese Rupees (~U.S. $110) and high as >15,000 Nepalese Rupees) and livestock (ls) (including buffalo, cattle and goats) owned by each household (small as <4 head of livestock and large >4 head of livestock). Similarly, for binary logistics regression, the dependent variable consisted of binary data of tiger sightings (pa) (presences and pseudo-absences), and the independent variables included hs, nearest distance (m) to the forest edge (f), water source (ws), grazing land (gl), household (hd), and road (r). This is a comma separated values file available in the Supplementary Materials section at doi.org/



SUPPLEMENTARY FIG. 1 Pearson correlation coefficients between shortest distance from tiger sighting locations (presence and absence) to various habitat parameters (N = 66).

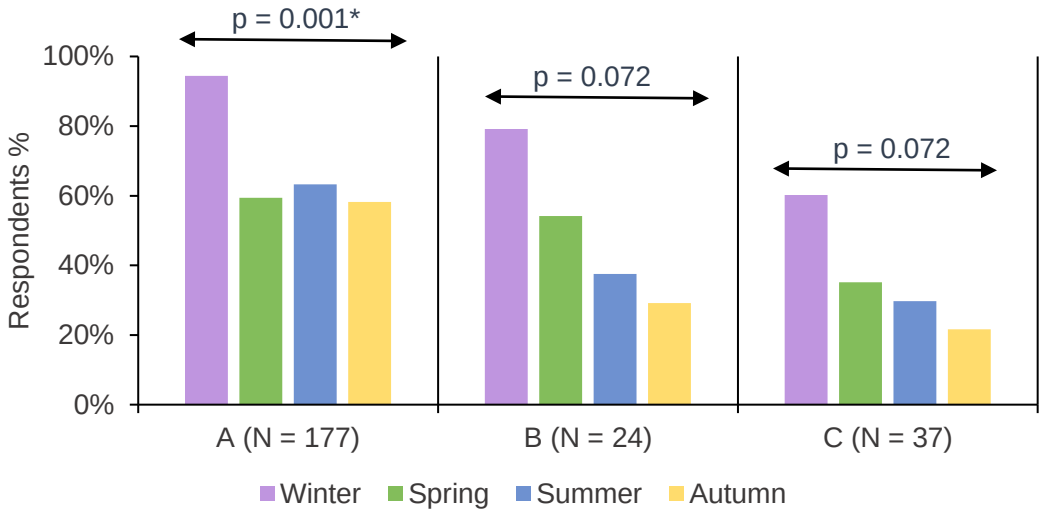
SUPPLEMENTARY TABLE 2 Candidate models for multinomial logistic regression (A) and binary logistics regression (B) (Table S1 provides description and codes of variables). Models for both tests were ranked based on Akaike information criterion with small sample bias adjustment (AICc). "K" indicates number of parameters in the model, "LL" as log-likelihood, "ΔAICc" as the difference in AICc score between the best model (model with the lowest AICc value) and the model being compared, "AICcWt" as the proportion of the total amount of predictive power of the model in the test and "Cum.Wt" as the cumulative sum of AICcWt. Based on AICc, model with settlement, education, and livestock (for multinomial), and settlement and distance to forest (for binary) stand out as best models compared with other models respectively. These selected models exhibited lower AICc values not only when compared to the null model, model without any variables, but also when compared to the models including all variables in their respective analyses. This suggests that the variables included in the best models provide a more effective explanation of both people's forest visitation patterns and the likelihood of sighting tigers in the Khata Corridor.

Models	**K**	**LL**	**AICc**	**ΔAICc**	**AICcWt**	**Cum.Wt**
A. Multinomial logistic regression (fvp as outcome variable)						
hs + age + ls + sex	24	-151.87	359.63	0.00	0.57	0.57
hs + age + ls	21	-156.38	360.73	1.10	0.33	0.90
hs + age + sex	21	-158.40	364.76	5.13	0.04	0.94
hs + age + ls + mi + sex (all)	27	-150.85	365.85	6.22	0.03	0.97
hs + age + mi	24	-155.57	367.04	7.41	0.01	0.98
hs + age	18	-163.45	367.22	7.59	0.01	0.99
hs + ls	15	-167.44	367.86	8.23	0.01	1.00
hs + age + mi	21	-161.67	371.30	11.67	0.00	1.00
hs + sex	15	-170.89	374.77	15.14	0.00	1.00
hs	12	-175.17	376.24	16.61	0.00	1.00
hs + mi	15	-172.51	378.00	18.37	0.00	1.00
ls	6	-230.10	472.69	113.06	0.00	1.00
sex	6	-231.59	475.68	116.05	0.00	1.00
age	9	-229.14	475.68	117.73	0.00	1.00
null	2	-237.36	480.86	121.24	0.00	1.00
mi	6	-234.41	481.31	121.68	0.00	1.00
B. Binary logistics regression (pa as outcome variable)						

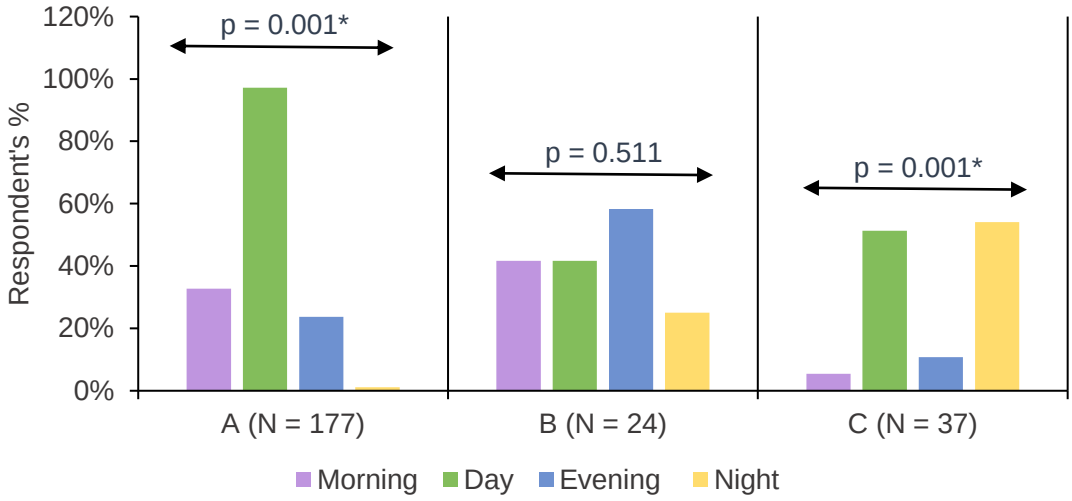
f + hs	5	-22.61	56.22	0.00	0.76	0.75
f + hs + hd (all)	6	-22.54	58.50	2.28	0.24	1.00
f	2	-33.55	71.28	15.06	0.00	1.00
f + hd	3	-33.06	72.51	16.29	0.00	1.00
hs	4	-32.07	72.80	16.58	0.00	1.00
hd	2	-42.87	89.92	33.70	0.00	1.00
null	2	-43.21	93.49	37.27	0.00	1.00

SUPPLEMENTARY TABLE 3 Summary of best multinomial logistics regression model following stepwise addition of variables. B = estimated coefficient; p-values (95% confidence) of ≤0.05 are marked by *; OR = odds ratio (exponential value of B); N = sample size. Yearly forest visitation pattern is compared with Daily, Weekly and Monthly. Thakurdwara (high economic benefits) is compared with other settlements. Old is compared with other age groups. Large livestock size is compared with small. All comparing variables are marked [c] (Table S1 provides description and codes of variables).

Variables in best-fit model	fvp (Yearly[c])								
	Daily			Weekly			Monthly		
	B	p value	OR	B	p value	OR	B	p value	OR
hs (N = 177)									
Pattharbhuji (N = 22)	6.948	0.000*	1041.937	3.293	0.018*	26.929	2.164	0.008*	8.707
Dalla (N = 34)	3.152	0.001*	23.375	1.917	0.024*	6.799	1.919	0.002*	6.820
Neulapur (N = 58)	3.371	0.001*	29.117	4.668	0.000*	106.581	2.937	0.000*	18.861
Thakurdwara[c] (N = 63)									
age (N = 177)									
Early adults (N = 72)	1.528	0.055	4.611	2.867	0.004*	8.058	0.528	0.419	0.695
Middle adults (N = 57)	-0.798	0.422	0.450	1.481	0.049*	4.398	1.237	0.044*	3.446
Late adults (N = 48)									
ls (N = 177)									
Small (N = 87)	0.506	0.443	1.658	-0.360	0.528	0.608	1.392	0.009*	4.023
Large[c] (N = 90)									
sex (N = 177)									
Male (N = 81)	-0.045	0.944	0.956	-1.220	0.035*	0.295	0.328	0.513	1.387
Female[c] (N = 96)									



SUPPLEMENTARY FIG. 2 Survey responses reflecting seasonal variability among A. forest visitation patterns, B. tiger sightings within the boundaries of human settlements (including near forest edge), and C. tiger attacks [both in human settlement areas (N = 6) and inside the forest (N = 31)]. Seasonal variation was assessed through chi-square goodness of fit test. Significant p-values (95% confidence) of ≤0.05 are marked by *. N is the total number of respondent's responses for each survey question.



SUPPLEMENTARY FIG. 3 Survey responses reflecting daily variability in timing of A. forest visitation patterns, B. tiger sightings within the boundaries of human settlements (including near forest edge), and C. tiger attacks [both in human settlement areas (N = 6) and inside the forest (N = 31)]. Daily variation was assessed through chi-square goodness of fit test. Significant p-values (95% confidence) of ≤0.05 are marked by *. N is the total number of respondent's responses for each survey question.

SUPPLEMENTARY TABLE 4 Summary of best binary logistics regression model following stepwise addition of variables. B = estimated coefficient; p-values (95% confidence) of ≤0.05 are marked by *; OR = odds ratio (exponential value of B); N = sample size. Thakurdwara (high economic benefits) is compared with other settlements and is marked by [c] (Table S1 for description and code of variables).

Variables in best model		pa		
		B	p value	OR
hs (N = 66)			0.003*	
	Pattharbhuji (N = 25)	4.775	0.001*	118.533
	Dalla (N = 15)	2.913	0.017*	18.405
	Neulapur (N = 12)	0.367	0.827	1.443
	Thakurdwara[c] (N = 14)			
f (N = 66)		-0.004	0.001*	1.02