Determining the risk of predator attacks around protected areas: the case of Bardia National Park, Nepal

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SUPPL	EMENTARY MATERIAL 1 Survey	y questionnaire.						
Name	of interviewer:							
Date:		Time:						
Addre	ss. Municipality/VDC.	Ward No:	Village.					
Consu	mer group:	vi uru 100.	v muge.					
	nici group.	E	Elevation					
UPS IC	Jeanon. n	E						
Ouest	ionnaire for interview to asse	ss human–wildlife co	nflict					
1)	Name:							
2)	Age: Gender	(Male/Female; score 1	,2):					
3)	Occupation:							
4)) Family members: Male Female Children (< 15 years old)							
5)	i) Ethnic group (score 1,2,3,4,5):							
	a) Bahun/Chhetri							
	b) Tharu							
	c) Janjati							
	d) Dalit							
	e) Other(mention)							
6)	Distance from Park boundary	(based on GPS locatio	n: score $1 2 3 4$).					
0)	a) 0–1 km		II, SCOLC 1,2,3,4).					
	b) 1–3 km							
	c) 3–5 km							
	d) > 5 km							
7)	Where were you born (if diffe	erent from present addr	ess)?					
8)	When did you come to stay (i	f not born here)? (score	e 1,2,3,4,5)					
	a) 0–5 years ago							
	b) 5–10 years ago							
	c) 10–20 years ago							
	d) 20–30 years ago							

- e) > 30 years ago
- 9) Why did you come to live here?
- 10) Can you differentiate between tigers, leopards and other animals (Yes/No; score 0,1; use photograph)

11) Source of livelihood (no. of months per year; score 1,2,3,4,5)

- a) Crop
- b) Livestock
- c) Employment
- d) Business
- e) Seasonal labour
- f) Others
- 12) What are the activities of other family members?
- 13) How long can the interviewee sustain on own crops and livestock (select only one; score 1,2,3,4,5,6)
 - a) < 1 month
 - b) 1–3 months
 - c) 3–6 months
 - d) 6–9 months
 - e) 9–12 months
 - f) > 1 year
- 14) Livestock holding (no. of animals)
 - a) Cattle (cows/oxen)
 - b) Buffalo
 - c) Goats/sheep
 - d) Pigs
 - e) Poultry
 - f) Fishes
- 15) Which area is utilized for livestock rearing (apply preference rating 1–4 based on priority)
 - a) National Park
 - b) Community forest
 - c) Government forest
 - d) Private land
- 16) Reasons for livestock loss in last year
 - a) Natural death (no. and species of livestock):
 - b) Disease (no. and species of livestock):
 - c) Theft (no. and species of livestock):
 - d) Wildlife attack (no. and species of livestock):
 - e) Accident (no. and species of livestock):
- 17) Monetary value of loss (in NPR):
- 18) Livestock lost to tiger/leopard/other wildlife attacks within this year (no. and species of livestock)
 - Place:

Date:

Time:

- a) Tiger
- b) Leopard
- c) Other wildlife (name species)

- 19) Attack on family members or relatives by wildlife within last 20 years (if yes: include place, time, date, gender and age of victim; state injury or death)
 - Place:Name of person:Age & gender:Date:Time:Injury/death:
 - a) Tiger
 - b) Leopard
 - c) Other wildlife (name species)
- 20) Have you seen tigers or leopards in your area in the last 5 years (Yes/No; score 1,0)
- 21) What was the frequency of seeing a tiger or leopard during past 5 years? (score 1–5: ≤ 2 attacks, score 1; 3–5 attacks, score 2; 6–8 attacks, score 3; 8–10 attacks, score 4; > 10 attacks = score 5)
- 22) Attitude towards tigers/leopards/other wildlife (score 1,0)
 - a) Dislike b) Like
- 23) Do you want to conserve wild animals? (Yes/No; score 1,0)
- 24) Support for tiger/leopard conservation even if a family member is affected (select only one option; score 1,-1,0)
 - a) Agree
 - b) Disagree
 - c) Neutral
- 25) Support for tiger/leopard even if livestock is killed (select only one option;
 - score 1,-1,0)
 - a) Agree
 - b) Disagree
 - c) Neutral
- 26) Education level (score 1,2,3,4,5,6):
 - a) Illiterate
 - b) Literate
 - c) Primary
 - d) Secondary
 - e) Higher secondary/university

Variable	Description	Value
Sector	Buffer zone sector	Categorical variable
Distance	Distance of the village to the Park boundary	Score (1–4) 1, nearest (≤ 1 km); 2, 1–3 km; 3, 3–5 km; 4, furthest (> 5 km)
Age	Age of the respondent	Continuous variable
Gender	Gender of the respondent	Categorical variable
Ethnic group	Ethnic group to which respondent belongs	Categorical variable
Household size	No. of members in the household	Continuous variable
Cattle owned	No. of cattle owned	Continuous variable
Self sufficiency	Time period that the respondent can sustain form their own land	Score (1–6): 1, sufficient for < 3 months; 6, sufficient for > 1 year
Recognize tiger & leopard	Ability to distinguish between a tiger and a leopard when presented with photographs of the felids (Yes/No)	Score (1,0)
Number of times seen	No. of time a tiger or a leopard is seen	Score (1-5): $1, \le 2$ times; $5, \ge 10$ times
Attitude towards wildlife	Respondent's positive attitude towards wildlife (Yes/ No)	Score (1,0)
Want to conserve wildlife	Respondent's willingness to conserve wildlife (Yes/ No)	Score (1,0)
Want to conserve wildlife even when family members are affected	Respondent's willingness to conserve wildlife even when family members are negatively affected by wildlife (Yes/ No)	Score (1,0)
Want to conserve wildlife even when livestock is killed by wildlife	Respondent's willingness to conserve wildlife even when livestock is killed by wildlife (Yes/ No)	Score (1,0)
Education	Respondent's highest level of education	Score (1–6): 1, illiterate; 6, high school or university/college level education
Overall loss	Livestock loss to all causes (Yes/No)	Score (1,0)
Loss to wildlife	Livestock loss to wildlife (Yes/No)	Score (1,0)
Loss to large wild felids	Loss of livestock to large felids (tigers and leopards; Yes/No)	Score (1,0)
Loss to tigers	Loss of livestock to tigers (Yes/No)	Score (1,0)
Loss to leopards	Loss of livestock to leopards (Yes/No)	Score (1,0)

SUPPLEMENTARY TABLE 1 Description of the variables used in our models.

SUPPLEMENTARY TABLE 2 Logistic models for the probability of livestock loss. Results of the likelihood ratio test are shown: degrees of freedom (Df); deviance of the model without the tested variable; Akaike information criterion of the model without the tested variable (AIC); difference between the deviance of the complete model and that of the model without the tested variable (χ^2) ; chance of χ^2 being not larger than zero (P-value).

Variables	Df	Deviance	AIC	<i>χ</i> ²	P-value
Overall probability of loss					
Sector	3	322.44	348.44	6.4348	0.092271^+
Distance to National Park	1	316.32	346.32	0.3161	0.573938
National Park	1	318.88	348.88	2.8763	0.089895^+
Community forest	1	324.33	354.33	8.3306	0.003898**
Government forest	1	316.76	346.76	0.7543	0.385115
Own land	1	319.57	349.57	3.5640	0.059046^+
Number of times seen	1	318.74	348.74	2.7335	0.098267^{+}
Ethnic group	1	320.04	350.04	4.0363	0.044531*
No. of goats and sheep	1	318.45	348.45	2.4473	0.117726
No. of cattle	1	319.40	349.40	3.4007	0.065170^{+}
No. of pigs	1	321.44	351.44	5.4372	0.019712*
No. of buffalo	1	316.25	346.25	0.2520	0.615642
Education	1	317.89	347.89	1.8900	0.169199
Probability of loss to wildlife					
Sector	3	286.67	312.67	10.2903	0.01625*
Distance to National Park	1	278.94	308.94	2.5578	0.10975
National Park	1	277.04	307.04	0.6553	0.41824
Community forest	1	277.45	307.45	1.0735	0.30016
Government forest	1	280.56	310.56	4.1836	0.04082*
Own land	1	276.57	306.57	0.1890	0.66376
Number of times seen	1	277.60	307.60	1.2140	0.27054
Ethnic group	1	280.44	310.44	4.0550	0.04404*
No. of goats and sheep	1	281.87	311.87	5.4902	0.01912*
No. of cattle	1	277.23	307.23	0.8511	0.35623
No. of pigs	1	282.38	312.38	5.9988	0.01432*
No. of buffalo	1	277.14	307.14	0.7557	0.38468
Education	1	276.44	306.44	0.0637	0.80068

SUPPLEMENTARY TABLE 2, continued.

Variables	Df	Deviance	AIC	χ ²	P-value
Probability of loss to leopards					
Sector	3	254.60	280.60	24.3283	2.133e-05***
Distance to National Park	1	231.11	261.11	0.8313	0.3618857
National Park	1	231.36	261.36	1.0811	0.2984409
Community forest	1	230.82	260.82	0.5496	0.4584844
Government forest	1	232.12	262.12	1.8433	0.1745697
Own land	1	230.97	260.97	0.6917	0.4055888
Number of times seen	1	230.59	260.59	0.3102	0.5775518
Ethnic group	1	237.28	267.28	7.0071	0.0081189**
Number of goats and sheep	1	242.21	272.21	11.9338	0.0005512***
Number of cattle	1	230.37	260.37	0.0954	0.7574018
Number of pigs	1	235.85	265.85	5.5722	0.0182473*
Number of buffalo	1	230.90	260.90	0.6230	0.4299252
Education	1	230.68	260.68	0.4063	0.5238361

 $^{+}P < 0.1$

*P < 0.05

**P < 0.01

***P < 0.001

SUPPLEMENTARY TABLE 3 Logistic models of attitude towards wildlife. Results of the likelihood ratio test are shown: degrees of freedom (Df); deviance of the model without the tested variable; Akaike information criterion of the model without the tested variable (AIC); difference between the deviance of the complete model and that of the model without the tested variable (χ^2); chance of χ^2 being not larger than zero (P-value).

Variables	Df	Deviance	AIC	χ ²	P-value		
Attitude towards wildlife							
Sector	3	154.69	200.69	8.7119	0.033378*		
Gender	1	150.40	200.40	4.4167	0.035589*		
Age	1	147.55	197.55	1.5708	0.210096		
Recognize tiger & leopard	1	146.83	196.83	0.8499	0.356570		
Self sufficiency	1	146.15	196.15	0.1654	0.684269		
Education	1	154.07	204.07	8.0957	0.004437**		
Overall probability of livestock kill	1	146.60	196.60	0.6179	0.431821		
Probability of livestock kill by wildlife	1	146.94	196.94	0.9639	0.326206		
Probability of livestock kill by a leopard	1	148.22	198.22	2.2393	0.134545		
Probability of human kill by a tiger	1	146.05	196.05	0.0741	0.785529		
Probability of human kill by other wildlife	6	152.85	192.85	6.8728	0.332775		
Probability of livestock kill by a tiger	1	148.91	198.91	2.9304	0.086928^{+}		
Probability of livestock kill by other wildlife	6	151.63	191.63	5.6499	0.463533		
Attitude towards wildlife conservation in general							
Sector	3	89.982	133.98	4.0069	0.26072		
Gender	1	88.755	136.75	2.7792	0.09550^{+}		
Recognize tiger & leopard	1	86.924	134.92	0.9488	0.33003		
Self sufficiency	1	90.539	138.54	4.5636	0.03266*		
Education	1	91.643	139.64	5.6681	0.01728*		
Overall probability of livestock kill	1	85.976	133.98	0.0003	0.98568		
Probability of livestock kill by wildlife	1	87.442	135.44	1.4669	0.22583		
Probability of livestock kill by a leopard	1	87.838	135.84	1.8630	0.17228		
Probability of human kill by a tiger	1	86.022	134.02	0.0463	0.82971		
Probability of human kill by other wildlife	6	87.861	125.86	1.8855	0.92992		
Probability of livestock kill by a tiger	1	89.387	137.39	3.4116	0.06474^{+}		
Probability of livestock kill by other wildlife	6	87.880	125.88	1.9048	0.92824		

SUPPLEMENTARY TABLE 3, continued.

Variables	Df	Deviance	AIC	χ ²	P-value		
Attitude towards wildlife conservation if a family member is affected							
Sector	3	102.36	146.35	2.0058	0.57121		
Gender	1	101.74	149.74	1.3922	0.23803		
Recognize tiger & leopard	1	101.07	149.07	0.7248	0.39459		
Self sufficiency	1	106.89	154.89	6.5439	0.01052*		
Education	1	105.72	153.72	5.3679	0.02051*		
Overall probability of a kill	1	103.83	151.82	3.4752	0.06229^{+}		
Probability of kill by wildlife	1	100.35	148.35	0.0000	1.00000		
Probability of kill by a leopard	1	101.94	149.94	1.5861	0.20788		
Probability of human kill by a tiger	1	100.54	148.54	0.1861	0.66621		
Probability of human kill by other wildlife	6	102.82	140.82	2.4715	0.87165		
Probability of kill by a tiger	1	102.08	150.08	1.7271	0.18878		
Probability of kill by other wildlife	6	102.97	140.97	2.6255	0.85417		

Attitude towards wildlife conservation if livestock is killed

Sector	3	192.30	236.30	50.556	6.081e-11***
Gender	1	141.93	189.93	0.181	0.67057
Recognize tiger & leopard	1	141.99	189.99	0.243	0.62196
Self sufficiency	1	142.45	190.45	0.705	0.40106
Education	1	166.18	214.18	24.429	7.710e-07***
Overall probability of livestock kill	1	146.36	194.36	4.617	0.03165*
Probability of livestock kill by wildlife	1	141.88	189.88	0.136	0.71200
Probability of livestock kill by a leopard	1	142.24	190.24	0.493	0.48251
Probability of human kill by a tiger	1	141.82	189.82	0.072	0.78800
Probability of human kill by other wildlife	6	148.74	186.74	6.992	0.32160
Probability of livestock kill by a tiger	1	142.77	190.77	1.025	0.31132
Probability of livestock kill by other wildlife	6	142.22	180.22	0.479	0.99809

 $^{^{+}}P < 0.1$

*P < 0.05

***P < 0.001