Human–wildlife interactions, and attitudes towards wildlife and wildlife reserves, in Rajasthan, India

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TABLE S1 Observed (and expected) influence of covariates on six response variables used to model attitudes towards wildlife and wildlife reserves among households in 1,096 villages within 10 km of Jaisamand, Kumbhalgarh & Todgarh Raoli, Phulwari ki Nal, and Sitamata Wildlife Sanctuaries in Rajasthan, India (Fig. 1). Blank cells indicate no expectations.

Variable	Importance of protection of wildlife reserves	Likely to value wildlife more in the absence of negative interactions	Crop damage	Livestock loss	Mitigation use against crop damage	Mitigation use against livestock loss
Reserve ID	✓	✓				
Distance to reserve			(−)	− (−)	+ (−)	+ (−)
Distance to water			(−)	(−)		
Elevation			+	+		
Gender	− (−)	− (−)				
No. of household members			(−)		(+)	(+)
Education level in the household	+ (+)	+ (+)			+ (+)	− (+)
Own livestock	(−)	(+)				
No. of livestock owned				+ (+)		+ (+)
Total agricultural land	(+)	(+)	(+)	(+)	(+)	(+)
No. of crops			+ (+)		(+)	
Oilseed crops			✓		✓	
Millet crops			✓		✓	
Cereal crops			✓		✓	
Pulses & legumes			✓		✓	
Mitigation use against crop damage	✓	+	+ (−)			
No. of mitigation measures against crop damage			(−)			
Mitigation use against livestock predation	+	✓		+ (−)		
Number of mitigation measures against livestock predation				(−)		

Fencing			(−)	(−)		
Night-time watching			(−)			
Guard animals			(−)			
Lighting			(−)			
Scare devices			(−)			
Increased vigilance				(−)		
Use of communal land				(+)		
Cattle owned				(+)		(+)
Buffalo owned				(+)		(+)
Goats owned				(+)		(+)
History of crop damage					+ (+)	
Jackal-related incident					(+)	+(+)
Pig-related incident					+ (+)	
Indian fox-related incident					(+)	
Nilgai-related incident					(+)	
Langur-related incident					(+)	
Wolf-related incident						+ (+)
Leopard-related incident						+ (+)
History of livestock loss						+ (+)
Crop raiding experienced	(−)	+ (+)				
Livestock predation experienced	(−)	+ (+)				

+/−, positive/negative association; (+/−), expected positive/negative association; ✓, included in the model

TABLE S2 Details of negative interactions with wildlife, and use of mitigation against such interactions, reported by households surveyed in Jaisamand, Kumbhalgarh & Todgarh Raoli, Phulwari ki Nal, and Sitamata Wildlife Sanctuaries Rajasthan. India (Fig. 1), during January–March 2014.

	Jaisamand	Kumbhalgarh	Phulwari	Sitamata
% households that believe it is important to protect areas for wild animals	81	81	81	89
% households that are likely to value wildlife & its protection more in the absence of negative interactions	90	83.5	55	67
% households reporting crop damage	83	80	69	76
Mean loss as a result of crop damage, INR (range)	8,677 (0–100,000)	109,950 (0–1,000,000)	7,361 (0–500,000)	9,200 (500–100,000)
% households growing the following crops:				
Cereal	96	86	98	95
Pulses & legumes	54	38	63	66.5
Oilseeds	20	38	40	76
Vegetables	10	13	10	12
Millet	9.5	35	4	8.45

	Jaisamand	Kumbhalgarh	Phulwari	Sitamata
Sesame	8	11.5	4	12
Cotton	0	5	24	3
Chilli	2	4.5	12	8
Groundnut	0	8	4	16
Garlic	1	4	1	10
Other	3	19	5	11
% households reporting crop damage by				
Nilgai *Boselaphus tragocamelus*	96	95.5	25	89
Jackal *Canis aureus*	21	11	58	31
Langur *Simia entellus*	14		20	13
Pig *Sus scrofa*	11.5	39	12	32
Indian fox *Vulpes bengalensis*	5.5	1	49	4
Birds	3	2	14	0
Other	0	9	19.5	20
No. of incidents of crop damage per	1 (1) 2–5 (12)	1 (1) 2–5 (6)	1 (1) 2–5 (6)	1 (0) 2–5 (1)

	Jaisamand	Kumbhalgarh	Phulwari	Sitamata
year (% households reporting)	5–10 (3) >10 (83)	5–10 (3) >10 (89)	5–10 (6) >10 (87)	5–10 (2) >10 (97)
No. of years experiencing crop damage (% households reporting)	2–5 (40) 6–10 (40) >10 (17.5)	1 (0.5) 2–5 (6) 6–10 (17) >10 (74)	2–5 (5) 6–10 (3) >10 (87.5)	1 (1) 2–5 (20) 6–10 (24) >10 (54)
Crop damage mitigation measures (% households reporting)	Night-time watching (72) Scare devices (56.5) Lighting (40) Fencing (32) Use of guard animals (15) Removal of bush/forest (5)	Night-time watching (70.5) Fencing (59) Lighting (55) Scare devices (52) Use of guard animals (22) Removal of bush/forest (18)	Scare devices (33) Night-time watching (29) Use of guard animals (23) Fencing (19) Lighting (8)	Night-time watching (66) Scare devices (58) Lighting (48) Fencing (44) Use of guard animals (26) Removal of bush/forest (16) Increased vigilance (8.5)
% households reporting livestock loss	10	22.5	9	8.5
Mean livestock loss, INR (Range)	13,636 (500–100,000)	10,077 (0–100,000)	1,436 (0–100,000)	8,152 (1,500–25,000)
Top species responsible for livestock loss (% households reporting)	Leopard (69.5) Jackal (17) Jungle cat (13)	Leopard (56) Jackal (27) Wolf (12)	Jackal (42) Leopard (37) Indian fox (17)	Leopard (62.5) Jackal (21) Hyaena (8)
No. of incidents of livestock loss per year (% households reporting)	1 (26) 2–5 (34) 5–10 (13) >10 (26)	1 (37.5) 2–5 (34) 5–10 (13) >10 (11.5)	1 (37) 2–5 (15) 5–10 (10) >10 (36)	1 (58) 2–5 (37.5) 5–10 (4) >10 (0)

	Jaisamand	Kumbhalgarh	Phulwari	Sitamata
No. of years experiencing livestock loss (% households reporting)	2–5 (9) >10 (9)	1 (11.5) 2–5 (12) 6–10 (12) >10 (57)	1 (8.5) 2–5 (3) 6–10 (8.5) >10 (68)	1 (17) 2–5 (21) 6–10 (4) >10 (54)
Livestock loss mitigation measures (% households reporting)	Increased vigilance (9)	Increased vigilance (23) Fencing (14)		Increased vigilance (13) Fencing (5)
% households reporting human death or injury caused by wildlife	0	0.6	0.3	0
No. of incidents of human death or injury caused by wildlife per year (% households reporting)	0	1 (67) 5–10 (17) >10 (17)	1 (50) 2–5 (50)	0
No. of years experiencing human death or injury (% households reporting)	0	1 (17) >10 (50)	2–5 (50)	0

TABLE S3 Covariates and their model-averaged beta coefficient estimates (±SE) for attitudes towards wildlife and wildlife reserves, crop damage, livestock loss and mitigation use, among households in 1,096 villages within 10 km of Jaisamand, Kumbhalgarh & Todgarh Raoli, Phulwari ki Nal, and Sitamata Wildlife Sanctuaries in Rajasthan, India (Fig. 1). Blank cells indicate variables were not included in models.

	Value wildlife reserves	Value wildlife in absence of negative interactions	Crop damage	Livestock predation	Mitigation use against crop damage	Mitigation use against livestock predation
Reserve ID (Phulwari)	−0.07±0.15	−1.31±0.14*				
Reserve ID (Jaisamand)	0.15±0.23	0.52±0.26*				
Reserve ID (Sitamata)	0.38±0.22	−0.86±0.18*				
Distance to reserve			−0.06±0.16	−0.35±0.15*	0.31±0.16*	0.34±0.14*
Distance to water			−0.02±0.16	0.06±0.16		
Elevation			0.73±0.16*	0.52±0.16*		
Total agricultural land	0.26±0.19	0.13±0.15	−0.31±0.18	0.06±0.13		0.03±0.13
No. of household members			0.09±0.17		−0.11±0.16	−0.18±0.14
Male respondents	−0.32±0.15*	−0.36±0.14*				
No. of crops			0.92±0.20*		0.28±0.18	
Mitigation use against crop damage	0.12±0.20	0.65±0.16*	4.02±0.17*			
Mitigation use against livestock loss	0.49±0.19*			3.26±0.16*		
Own livestock	−0.27±0.21	−0.03±0.18				
No. of livestock (1−5)				0.39±0.21		0.66±0.19*
No. of livestock (6−10)				0.62±0.24*		0.49±0.23*
No. of livestock				0.59±0.34		0.93±0.33*

(11−15)					
No. of livestock (16−20)			0.63±0.44		1.49±0.44*
No. of livestock (>20)			1.11±0.34*		1.23±0.35*
No. of years of interactions (1−5)				1.37±0.35*	1.07±0.42*
No. of years of interactions (6−10)				1.68±0.35*	0.89±0.54
No. of years of interactions (>10)				1.63±0.30*	1.59±0.35*
Education level of household (<8th grade)	0.47±0.21*	0.62±0.20*		0.49±0.27*	−0.40±0.27
Education level of household (8−12th grade)	0.63±0.20*	0.91±0.19*		0.74±0.26*	−0.18±0.25
Education level of household (>12th grade)	0.81±0.26*	1.16±0.24*		0.99±0.34*	−0.58±0.31*
Wild pig-related incident				0.37±0.22*	
Indian fox-related incident				−0.49±0.20	
Langur-related incident				0.10±0.22	
Wolf-related incident					2.22±0.55*
Jackal-related incident					1.38±0.39*
Leopard-related incident					2.29±0.34*
Occurrence of crop damage	0.02±0.21	1.53±0.17*			
Occurrence of livestock loss		0.84±0.21*			

*Statistically significant at P<0.05

TABLE S4 Top-ranked models for importance of protection of habitat and value of wildlife in absence of negative human−wildlife interaction, with beta coefficients (±SE). Blank cells indicate variables were not included in models.

	Importance of protection of habitat		More likely to value
Models	1	3	1
AICc weight	0.70	0.28	1
Intercept	1.36±0.18	1.30±0.17	0.61±0.17
Reserve ID (Phulwari)	−0.07±0.15		−1.31±0.14*
Reserve ID (Jaisamand)	0.15±0.23		0.52±0.26*
Reserve ID (Sitamata)	0.38±0.22		−0.86±0.18*
Total agricultural land	0.26±0.19		0.13±0.15
Livestock owners	−0.27±0.21		−0.03±0.18
Gender	−0.30±0.15*	−0.35±0.14*	−0.36±0.14*
Education level of household (<8th grade)	0.46±0.21*	0.48±0.21*	0.62±0.20*
Education level of household (8−12 grade)	0.62±0.20*	0.66±0.20*	0.91±0.19*
Education level of household (>12th grade)	0.79±0.26*	0.86±0.26*	1.16±0.24*
Mitigation use against livestock predation	0.49±0.19*		
Mitigation use against crop damage	0.12±0.20		0.65±0.16*
Crop damage experienced	0.02±0.21		1.53±0.17*
Livestock predation experienced			0.84±0.21*

ΔAICc[1]	0	1.79	0
Model AICc	1,705.74	1,707.53	1,888.72

*Statistically significant at P<0.05
[1]The difference between the model with the lowest AICc value and this model

TABLE S5 Top-ranked models for crop damage, with beta coefficients (±SE). Blank cells indicate variables were not included in models.

Models	10	11	12	13	14	15
AICc weight	0.34	0.16	0.15	0.13	0.13	0.07
Intercept	2.45±0.11	2.44±0.11	2.45±0.11	2.45±0.11	2.45±0.11	2.44±0.11
Distance to reserve				−0.06±0.16		
Distance to water					−0.02±0.16	
Elevation	0.72±0.16*	0.75±0.16*	0.72±0.16*	0.72±0.16*	0.73±0.17*	0.75±0.16*
Total agricultural land	−0.31±0.18		−0.32±0.18	−0.31±0.18	−0.31±0.18	
No. of household members			0.10±0.17			0.08±0.17
No. of crops	0.94±0.20*	0.86±0.19*	0.93±0.20*	0.94±0.20*	0.94±0.20*	0.85±0.19*
Mitigation use by household	4.02±0.17*	4.01±0.17*	4.02±0.17*	4.03±0.18*	4.02±0.18*	4.01±0.17*
ΔAICc[1]	0	1.44	1.68	1.86	1.99	3.20
AICc	1,082.19	1,083.64	1,083.87	1,084.05	1,084.18	1,085.39

*Statistically significant at P<0.05
[1]The difference between the model with the lowest AICc value and this model

TABLE S6 Top-ranked models for livestock, with beta coefficients (±SE). Blank cells indicate variables were not included in models.

Models	11	12	14	1
AICc weight	0.56	0.23	0.12	0.09
Intercept	−2.47±0.12	−2.47±0.12	−2.45±0.12	−2.47±0.12
Distance to reserve	−0.35±0.15*	−0.35±0.15*		−0.34±0.16*
Distance to water				0.06±0.16
Elevation	0.52±0.16*	0.53±0.16*	0.54±0.16*	0.51±0.17*
Total agricultural land		0.06±0.13		0.06±0.13
No. of livestock (1−5)	0.40±0.21	0.40±0.21	0.37±0.20	0.40±0.21
No. of livestock (6−10)	0.62±0.24*	0.62±0.24*	0.61±0.24*	0.62±0.24*
No. of livestock (11−15)	0.59±0.34	0.59±0.34	0.61±0.34	0.59±0.34
No. of livestock (16−20)	0.64±0.44	0.64±0.44	0.60±0.45	0.64±0.44
No. of livestock (>20)	1.12±0.34*	1.12±0.34*	1.07±0.34*	1.12±0.34*
Mitigation use against livestock predation	3.26±0.16*	3.27±0.16*	3.24±0.16*	3.27±0.16*
ΔAICc[1]	0	1.81	3.12	3.69
AICc	1,162.08	1,163.89	1,165.20	1,165.76

*Statistically significant at P<0.05
[1]The difference between the model with the lowest AICc value and this model

TABLE S7 Top-ranked models for mitigation use against crop damage, with beta coefficients (±SE). Blank cells indicate variables were not included in models.

Models	10	11	12	13	14	15
AICc weight	0.21	0.17	0.17	0.14	0.14	0.14
Intercept	−1.95±0.24	−1.91±0.24	−2.01±0.24	0.31±0.14	−1.99±0.24	−1.91±0.24
Distance to reserve	0.31±0.14*	0.33±0.14*	0.31±0.14*	0.33±0.14*	0.31±0.14*	0.31±0.14*
No. of household members					−0.15±0.14	
No. of years of interactions (1−5)	3.34±0.25*	3.32±0.25*	3.34±0.25*	3.32±0.25*	3.34±0.25*	3.33±0.25*
No. of years of interactions (6−10)	3.65 (0.25) *	3.63 (0.25) *	3.67 (0.25) *	3.66 (0.25) *	3.65 (0.25) *	3.63 (0.25) *
No. of years of interactions (>10)	3.56±0.18*	3.47±0.16*	3.59±0.18*	3.50±0.16*	3.57±0.18*	3.52±0.18*
Education level of household (<8th grade)	0.53±0.24*	0.54±0.24*	0.56±0.24*	0.57±0.24*	0.56±0.24*	0.53±0.24*
Education level of household (8−12th grade)	0.68±0.23*	0.69±0.23*	0.74±0.23*	0.75±0.23*	0.73±0.23*	0.67±0.23*
Education level of household (>12th grade)	0.84±0.28*	0.85±0.28*	0.91±0.28*	0.92±0.28*	0.90±0.29*	0.83±0.28*
No. of crops	0.24±0.16	0.24±0.16			0.24±0.16	0.25±0.16
Pig	0.48±0.22*	0.54±0.21*	0.53±0.22*	0.60±0.21*	0.48±0.22*	0.49±0.22*
Indian fox	−0.33±0.21		−0.33±0.21		−0.31±0.21	−0.35±0.21
Langur						0.24±0.23

ΔAICc[1]	0	0.36	0.39	0.79	0.80	0.84
AICc	1,478.37	1,478.74	1,478.77	1,479.17	1,479.17	1,479.22

*Statistically significant at P<0.05
[1]The difference between the model with the lowest AICc value and this model

TABLE S8 Top-ranked models for mitigation use against livestock predation, with beta coefficients (±SE). Blank cells indicate variables were not included in models.

Models	14	9	10	13	1	11
AICc weight	0.30	0.27	0.19	0.10	0.07	0.04
Intercept	−2.05±0.10	−1.75±0.24	−1.80±0.24	−1.74±0.24	−1.79±0.24	−1.74±0.24
Distance to reserve	0.34±0.14*	0.34±0.14*	0.34±0.14*	0.34±0.14*	0.34±0.14*	
Total agricultural land				0.03±0.13	0.04±0.13	
No. of household members	−0.19±0.14		−0.16±0.14		−0.17±0.14	
No. of livestock (1−5)	0.65±0.19*	0.67±0.19*	0.67±0.19*	0.67±0.19*	0.67±0.19*	0.68±0.19*
No. of livestock (6−10)	0.50±0.23*	0.48±0.23*	0.50±0.23*	0.48±0.23*	0.50±0.23 *	0.47±0.23*
No. of livestock (11−15)	0.95±0.33*	0.92±0.33*	0.93±0.33*	0.92±0.33*	0.93±0.33*	0.88±0.33*
No. of livestock (16−20)	1.52±0.44*	1.47±0.44*	1.49±0.44*	1.47±0.44*	1.49±0.44*	1.45±0.43*
No. of livestock (>20)	1.22±0.35*	1.21±0.35*	1.24±0.35*	1.21±0.35*	1.24±0.35*	1.28±0.35*
Wolf responsible for predation	2.21±0.55*	2.21±0.55*	2.22±0.55*	2.22±0.55*	2.23±0.55*	2.21±0.55*
Jackal responsible for predation	1.36±0.39*	1.38±0.39*	1.40±0.39*	1.38±0.39*	1.41±0.39*	1.36±0.39*
Leopard responsible for predation	2.26±0.33*	2.31±0.33*	2.31±0.34*	2.31±0.34*	2.31±0.34*	2.31±0.33*

No. of years of interactions (1–5)	1.11±0.42*	1.05±0.42*	1.06±0.42*	1.05±0.42*	1.05±0.42*	1.08±0.42*
No. of years of interactions (6–10)	0.96±0.54	1.59±0.35	0.87±0.54	0.85±0.54	0.86±0.54	0.78±0.54
No. of years of interactions (>10)	1.60±0.35*	0.86±0.54*	1.58±0.35*	1.58±0.35*	1.58±0.35*	1.54±0.35*
Education level of household (<8th grade)		−0.41±0.26	−0.38±0.27	−0.41±0.26	−0.38±0.27	−0.41±0.26
Education level of household (8–12th grade)		−0.20±0.25	−0.15±0.25	−0.20±0.25	−0.15±0.25	−0.19±0.25
Education level of household (>12th grade)		−0.61±0.31*	−0.54±0.31	−0.62±0.31*	−0.55±0.31	−0.58±0.31
ΔAICc[1]	0	0.19	0.89	2.16	2.83	4.19
AICc	1,428.67	1,428.86	1,429.56	1,430.83	1,431.50	1,432.86

*Statistically significant at P<0.05
[1]The difference between the model with the lowest AICc value and this model