

Supporting Materials

First assessment of factors affecting breeding success of two stork species in lowland Nepal using Bayesian Network models

Table S1. Probability tables associated with the best-performing Bayesian Network model of Asian Openbill (Model 8; see Table 4 and Fig. 3 in text). See text Table 1 for descriptions of variables.

Response variable:

Asian Openbill colony breeding success

Breeding success (no. fledglings/nest):	0.571 to < 2.292	2.292 to < 2.3	2.3 to < 2.6	2.6 to 3.8
Probabilities:	30.7692	7.69228e-05	38.4615	30.7692

Covariates:

Season

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)			
	1	2	3	6
0.571 to < 2.292	25	49.9997	25	0.000249997
2.292 to < 2.3	25	25	25	25
2.3 to < 2.6	20	39.9999	39.9999	0.0002
2.6 to 3.8	49.9997	25	0.000249997	25

Table S1 (*continued*).

Wetlands

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)	Wetlands (sq km in 5 km buffer)			
		0.91 to < 2.11	2.11 to < 2.17	2.17 to < 2.178	2.178 to 2.98
0.571 to < 2.292	1	0.00099996	0.00099996	99.997	0.00099996
0.571 to < 2.292	2	49.9995	49.9995	0.00049999	0.00049999
0.571 to < 2.292	3	0.00099996	0.00099996	0.00099996	99.997
0.571 to < 2.292	6	25	25	25	25
2.292 to < 2.3	1	25	25	25	25
2.292 to < 2.3	2	25	25	25	25
2.292 to < 2.3	3	25	25	25	25
2.292 to < 2.3	6	25	25	25	25
2.3 to < 2.6	1	0.00099996	0.00099996	99.997	0.00099996
2.3 to < 2.6	2	49.9995	49.9995	0.00049999	0.00049999
2.3 to < 2.6	3	0.00049999	0.00049999	0.00049999	99.9985
2.3 to < 2.6	6	25	25	25	25
2.6 to 3.8	1	0.00049999	49.9995	0.00049999	49.9995
2.6 to 3.8	2	99.997	0.00099996	0.00099996	0.00099996
2.6 to 3.8	3	25	25	25	25
2.6 to 3.8	6	99.997	0.00099996	0.00099996	0.00099996

Table S1 (continued).

Human habitation

Breeding success (no. fledglings/ nest)	Wetlands (sq km in 5 km buffer)	Human habitation (sq km in 1 km buffer)			
		0.024 to < 0.038	0.038 to < 0.066	0.066 to < 0.074	0.074 to 0.096
0.571 to < 2.292	0.91 to < 2.11	0.00099996	0.00099996	99.997	0.00099996
0.571 to < 2.292	2.11 to < 2.17	99.997	0.00099996	0.00099996	0.00099996
0.571 to < 2.292	2.17 to < 2.178	0.00099996	0.00099996	0.00099996	99.997
0.571 to < 2.292	2.178 to 2.98	0.00099996	0.00099996	0.00099996	99.997
2.292 to < 2.3	0.91 to < 2.11	25	25	25	25
2.292 to < 2.3	2.11 to < 2.17	25	25	25	25
2.292 to < 2.3	2.17 to < 2.178	25	25	25	25
2.292 to < 2.3	2.178 to 2.98	25	25	25	25
2.3 to < 2.6	0.91 to < 2.11	0.00099996	0.00099996	99.997	0.00099996
2.3 to < 2.6	2.11 to < 2.17	0.00099996	99.997	0.00099996	0.00099996
2.3 to < 2.6	2.17 to < 2.178	99.997	0.00099996	0.00099996	0.00099996
2.3 to < 2.6	2.178 to 2.98	49.9995	0.00049999	0.00049999	49.9995
2.6 to 3.8	0.91 to < 2.11	49.9995	49.9995	0.00049999	0.00049999
2.6 to 3.8	2.11 to < 2.17	0.00099996	99.997	0.00099996	0.00099996
2.6 to 3.8	2.17 to < 2.178	25	25	25	25
2.6 to 3.8	2.178 to 2.98	0.00099996	0.00099996	0.00099996	99.997

Table S1 (*continued*).

Colony size

Breeding success (no. fledglings/ nest)	Human habitation (sq km in 1 km buffer)	Colony size (no. nests)			
		5 to < 10	10 to < 17	17 to < 100	100–130
0.571 to < 2.292	0.024 to < 0.038	99.997	0.00099996	0.00099996	0.00099996
0.571 to < 2.292	0.038 to < 0.066	25	25	25	25
0.571 to < 2.292	0.066 to < 0.074	0.00099996	0.00099996	0.00099996	99.997
0.571 to < 2.292	0.074 to 0.096	0.00049999	0.00049999	99.9985	0.00049999
2.292 to < 2.3	0.024 to < 0.038	25	25	25	25
2.292 to < 2.3	0.038 to < 0.066	25	25	25	25
2.292 to < 2.3	0.066 to < 0.074	25	25	25	25
2.292 to < 2.3	0.074 to 0.096	25	25	25	25
2.3 to < 2.6	0.024 to < 0.038	0.00049999	99.9985	0.00049999	0.00049999
2.3 to < 2.6	0.038 to < 0.066	0.00099996	99.997	0.00099996	0.00099996
2.3 to < 2.6	0.066 to < 0.074	0.00099996	0.00099996	0.00099996	99.997
2.3 to < 2.6	0.074 to 0.096	0.00099996	0.00099996	0.00099996	99.997
2.6 to 3.8	0.024 to < 0.038	99.997	0.00099996	0.00099996	0.00099996
2.6 to 3.8	0.038 to < 0.066	49.9995	0.00049999	0.00049999	49.9995
2.6 to 3.8	0.066 to < 0.074	25	25	25	25
2.6 to 3.8	0.074 to 0.096	0.00099996	0.00099996	99.997	0.00099996

Table S2. Probability tables associated with the best-performing Bayesian Network model of Lesser Adjutant using 5 levels for breeding success (Model 8; see Table 5 and Fig. 4 in text).

Response variable:

Lesser Adjutant colony breeding success

Breeding success (no. fledglings/nest):	0 to < 1	1 to < 1.5	1.5 to < 1.67	1.67 to < 2	2 to 2.125
Probabilities:	13.8889	13.8889	16.6667	8.33335	47.2222

Covariates:

Season

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)				
	1 to < 2	2	> 2 to < 4	4 to < 7	7 to 18
0 to < 1	0.000199998	20	20	59.9996	0.000199998
1 to < 1.5	20	20	39.9998	20	0.000199998
1.5 to < 1.67	0.000166665	16.6667	49.9998	16.6667	16.6667
1.67 to < 2	0.000333328	0.000333328	66.6659	33.3331	0.000333328
2 to 2.125	6.25004	25	18.75	12.5	37.4999

Table S2 (*continued*).

Wetlands

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)	Wetlands (sq km in 5 km buffer)				
		0.38 to < 1.61	1.61 to < 2	2 to < 2.42	2.42 to < 2.6	2.6 to 3.9
0 to < 1	1 to < 2	20	20	20	20	20
0 to < 1	2	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0 to < 1	> 2 to < 4	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0 to < 1	4 to < 7	33.3331	0.000333328	66.6659	0.000333328	0.000333328
0 to < 1	7 to 18	20	20	20	20	20
1 to < 1.5	1 to < 2	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1 to < 1.5	2	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1 to < 1.5	> 2 to < 4	0.000499987	0.000499987	0.000499987	49.9992	49.9992
1 to < 1.5	4 to < 7	0.00099995	99.996	0.00099995	0.00099995	0.00099995
1 to < 1.5	7 to 18	20	20	20	20	20
1.5 to < 1.67	1 to < 2	20	20	20	20	20
1.5 to < 1.67	2	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1.5 to < 1.67	> 2 to < 4	0.000333328	33.3331	33.3331	33.3331	0.000333328
1.5 to < 1.67	4 to < 7	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1.5 to < 1.67	7 to 18	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1.67 to < 2	1 to < 2	20	20	20	20	20
1.67 to < 2	2	20	20	20	20	20
1.67 to < 2	> 2 to < 4	49.9992	49.9992	0.000499987	0.000499987	0.000499987
1.67 to < 2	4 to < 7	0.00099995	0.00099995	99.996	0.00099995	0.00099995
1.67 to < 2	7 to 18	20	20	20	20	20
2 to 2.125	1 to < 2	99.996	0.00099995	0.00099995	0.00099995	0.00099995
2 to 2.125	2	24.9999	0.000249997	49.9996	0.000249997	24.9999
2 to 2.125	> 2 to < 4	0.000333328	0.000333328	66.6659	33.3331	0.000333328
2 to 2.125	4 to < 7	0.000499987	49.9992	0.000499987	49.9992	0.000499987
2 to 2.125	7 to 18	33.3332	16.6667	16.6667	33.3332	0.000166665

Table S2 (*continued*).**Human habitation**

Breeding success (no. fledglings/nest)	Wetlands (sq km in 5 km buffer)	Human habitation (sq km in 1 km buffer)				
		0.022 to < 0.073	0.073 to < 0.097	0.097 to < 0.103	0.103 to < 0.128	0.128 to 0.23
0 to < 1	0.38 to < 1.61	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0 to < 1	1.61 to < 2	20	20	20	20	20
0 to < 1	2 to < 2.42	0.000499987	49.9992	0.000499987	49.9992	0.000499987
0 to < 1	2.42 to < 2.6	20	20	20	20	20
0 to < 1	2.6 to 3.9	49.9992	0.000499987	0.000499987	49.9992	0.000499987
1 to < 1.5	0.38 to < 1.61	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1 to < 1.5	1.61 to < 2	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1 to < 1.5	2 to < 2.42	20	20	20	20	20
1 to < 1.5	2.42 to < 2.6	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1 to < 1.5	2.6 to 3.9	99.998	0.000499987	0.000499987	0.000499987	0.000499987
1.5 to < 1.67	0.38 to < 1.61	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1.5 to < 1.67	1.61 to < 2	0.00099995	99.996	0.00099995	0.00099995	0.00099995
1.5 to < 1.67	2 to < 2.42	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1.5 to < 1.67	2.42 to < 2.6	49.9992	0.000499987	0.000499987	49.9992	0.000499987
1.5 to < 1.67	2.6 to 3.9	0.00099995	99.996	0.00099995	0.00099995	0.00099995
1.67 to < 2	0.38 to < 1.61	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1.67 to < 2	1.61 to < 2	0.00099995	99.996	0.00099995	0.00099995	0.00099995
1.67 to < 2	2 to < 2.42	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1.67 to < 2	2.42 to < 2.6	20	20	20	20	20
1.67 to < 2	2.6 to 3.9	20	20	20	20	20
2 to 2.125	0.38 to < 1.61	0.000249997	49.9996	0.000249997	0.000249997	49.9996
2 to 2.125	1.61 to < 2	0.000499987	0.000499987	0.000499987	49.9992	49.9992
2 to 2.125	2 to < 2.42	0.000199998	0.000199998	39.9998	39.9998	20
2 to 2.125	2.42 to < 2.6	49.9996	24.9999	24.9999	0.000249997	0.000249997
2 to 2.125	2.6 to 3.9	0.00099995	0.00099995	0.00099995	99.996	0.00099995

Table S2 (*continued*).

Colony size

Breeding success (no. fledglings/ nest)	Human habitation (sq km in 1 km buffer)	Colony size (no. nests)				
		< 1	1 to < 2	2	> 2 to < 6	6 to 13
0 to < 1	0.022 to < 0.073	99.996	0.00099995	0.00099995	0.00099995	0.00099995
0 to < 1	0.073 to < 0.097	99.996	0.00099995	0.00099995	0.00099995	0.00099995
0 to < 1	0.097 to < 0.103	20	20	20	20	20
0 to < 1	0.103 to < 0.128	49.9992	0.000499987	49.9992	0.000499987	0.000499987
0 to < 1	0.128 to 0.23	99.996	0.00099995	0.00099995	0.00099995	0.00099995
1 to < 1.5	0.022 to < 0.073	33.3331	0.000333328	33.3331	33.3331	0.000333328
1 to < 1.5	0.073 to < 0.097	20	20	20	20	20
1 to < 1.5	0.097 to < 0.103	20	20	20	20	20
1 to < 1.5	0.103 to < 0.128	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1 to < 1.5	0.128 to 0.23	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1.5 to < 1.67	0.022 to < 0.073	0.000499987	0.000499987	0.000499987	99.998	0.000499987
1.5 to < 1.67	0.073 to < 0.097	0.000499987	0.000499987	49.9992	0.000499987	49.9992
1.5 to < 1.67	0.097 to < 0.103	20	20	20	20	20
1.5 to < 1.67	0.103 to < 0.128	0.000499987	0.000499987	0.000499987	99.998	0.000499987
1.5 to < 1.67	0.128 to 0.23	20	20	20	20	20
1.67 to < 2	0.022 to < 0.073	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1.67 to < 2	0.073 to < 0.097	0.00099995	0.00099995	0.00099995	99.996	0.00099995
1.67 to < 2	0.097 to < 0.103	20	20	20	20	20
1.67 to < 2	0.103 to < 0.128	0.00099995	0.00099995	0.00099995	0.00099995	99.996
1.67 to < 2	0.128 to 0.23	20	20	20	20	20
2 to 2.125	0.022 to < 0.073	49.9991	0.000499989	49.9994	0.000499989	0.000499989
2 to 2.125	0.073 to < 0.097	66.6659	0.000333328	0.000333328	33.3331	0.000333328
2 to 2.125	0.097 to < 0.103	0.000333328	0.000333328	66.6659	0.000333328	33.3331
2 to 2.125	0.103 to < 0.128	74.9993	0.000249997	0.000249997	24.9999	0.000249997
2 to 2.125	0.128 to 0.23	74.9993	0.000249997	24.9999	0.000249997	0.000249997

Table S3. Probability tables associated with the best-performing Bayesian Network model of Lesser Adjutant using 2 levels for breeding success (Model 16; see Table 5 and Fig. 5 in text).

Response variable:

Lesser Adjutant colony breeding success

Breeding success (no. fledglings/nest):	0	> 0 to 2.125
Probabilities:	13.8889	86.1111

Covariates:

Season

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)				
	1 to < 2	2	> 2 to < 4	4 to < 7	7 to 18
0	0.000199998	20	20	59.9996	0.000199998
> 0 to 2.125	6.66669	20	33.3333	16.6667	23.3333

Wetlands

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)	Wetlands (sq km in 5 km buffer)				
		0.38 to < 1.61	1.61 to < 2	2 to < 2.42	2.42 to < 2.6	2.6 to 3.9
0	1 to < 2	20	20	20	20	20
0	2	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0	> 2 to < 4	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0	4 to < 7	33.3331	0.000333328	66.6659	0.000333328	0.000333328
0	7 to 18	20	20	20	20	20
> 0 to 2.125	1 to < 2	99.998	0.000499987	0.000499987	0.000499987	0.000499987
> 0 to 2.125	2	16.6667	0.000166665	33.3332	0.000166665	49.9997
> 0 to 2.125	> 2 to < 4	10.0001	20	30	30	10.0001
> 0 to 2.125	4 to < 7	0.000199998	39.9998	20	39.9998	0.000199998
> 0 to 2.125	7 to 18	42.857	14.2858	14.2858	28.5714	0.000142856

Table S3 (continued).

Human habitation

Breeding success (no. fledglings/ nest)	Wetlands (sq km in 5 km buffer)	Human habitation (sq km in 1 km buffer)				
		0.022 to < 0.073	0.073 to < 0.097	0.097 to < 0.103	0.103 to < 0.128	0.128 to 0.23
0	0.38 to < 1.61	0.00099995	0.00099995	0.00099995	0.00099995	99.996
0	1.61 to < 2	20	20	20	20	20
0	2 to < 2.42	0.000499987	49.9992	0.000499987	49.9992	0.000499987
0	2.42 to < 2.6	20	20	20	20	20
0	2.6 to 3.9	49.9992	0.000499987	0.000499987	49.9992	0.000499987
> 0 to 2.125	0.38 to < 1.61	28.5714	28.5714	0.000142856	14.2858	28.5714
> 0 to 2.125	1.61 to < 2	0.000199998	39.9998	0.000199998	20	39.9998
> 0 to 2.125	2 to < 2.42	0.000142856	0.000142856	28.5714	57.1426	14.2858
> 0 to 2.125	2.42 to < 2.6	57.1426	14.2858	14.2858	14.2858	0.000142856
> 0 to 2.125	2.6 to 3.9	49.9996	24.9999	0.000249997	24.9999	0.000249997

Colony size

Breeding success (no. fledglings/ nest)	Season (calendar week of first egg laid)	Colony size (no. nests)				
		< 1	1 to < 2	2	> 2 to < 6	6 to 13
0	1 to < 2	20	20	20	20	20
0	2	99.996	0.00099995	0.00099995	0.00099995	0.00099995
0	> 2 to < 4	99.996	0.00099995	0.00099995	0.00099995	0.00099995
0	4 to < 7	66.6659	0.000333328	33.3331	0.000333328	0.000333328
0	7 to 18	20	20	20	20	20
> 0 to 2.125	1 to < 2	0.000499987	0.000499987	49.9992	0.000499987	49.9992
> 0 to 2.125	2	66.6663	0.000166665	16.6667	0.000166665	16.6667
> 0 to 2.125	> 2 to < 4	30	9.99995e-05	20	39.9999	10.0001
> 0 to 2.125	4 to < 7	0.000199998	0.000199998	20	59.9996	20
> 0 to 2.125	7 to 18	42.857	0.000142856	14.2858	28.5714	14.2858

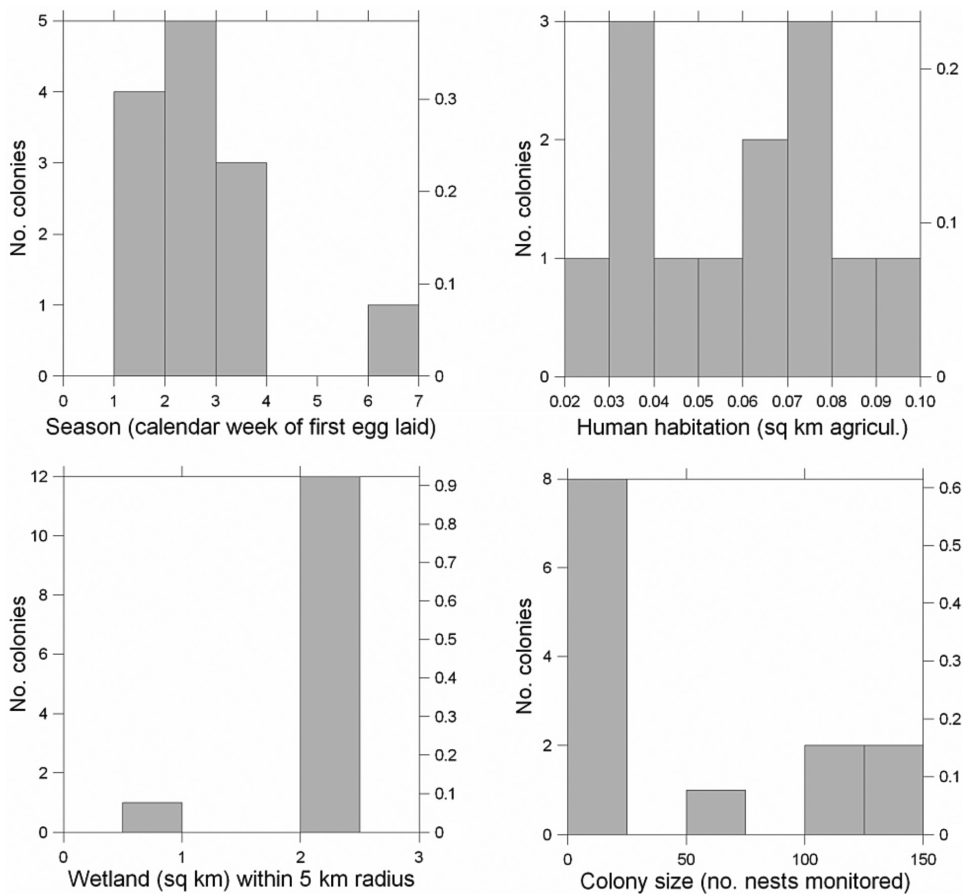


Figure S1. Frequency histograms of Asian Openbill covariate values, in relation to the number of colonies (see Table 1 for description of variables).

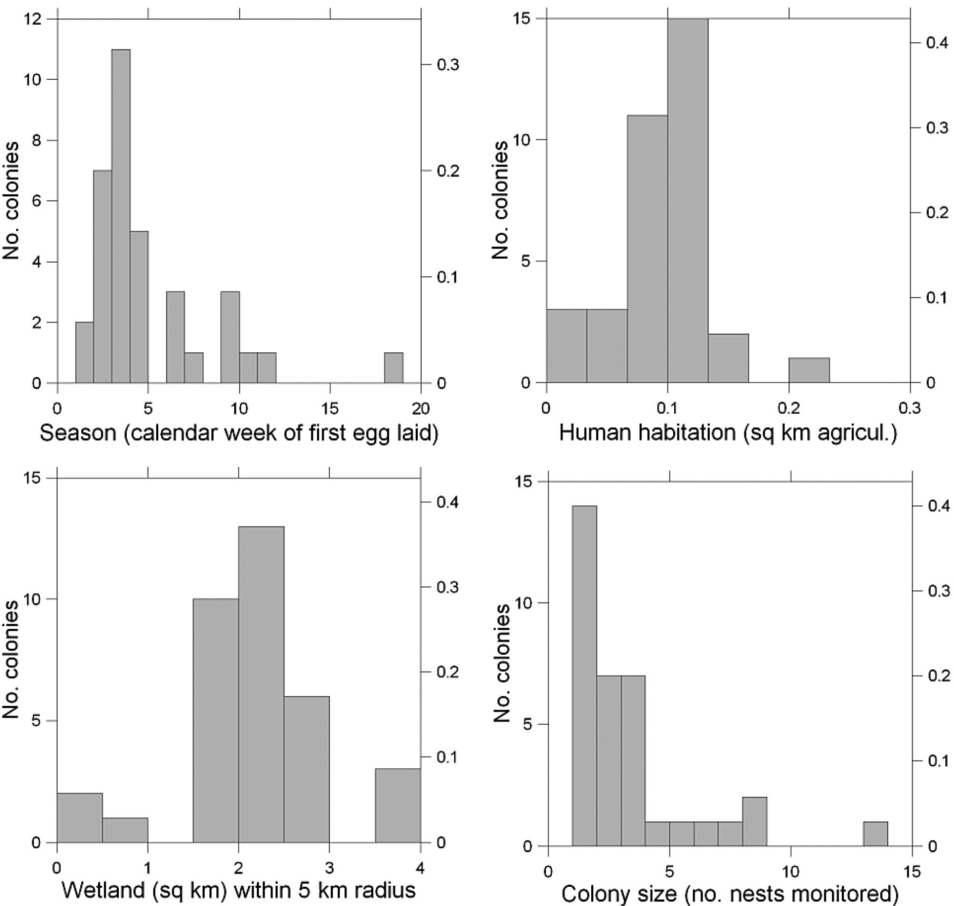


Figure S2. Frequency histograms of Lesser Adjutant covariate values, in relation to the number of colonies (see Table 1 for description of variables).

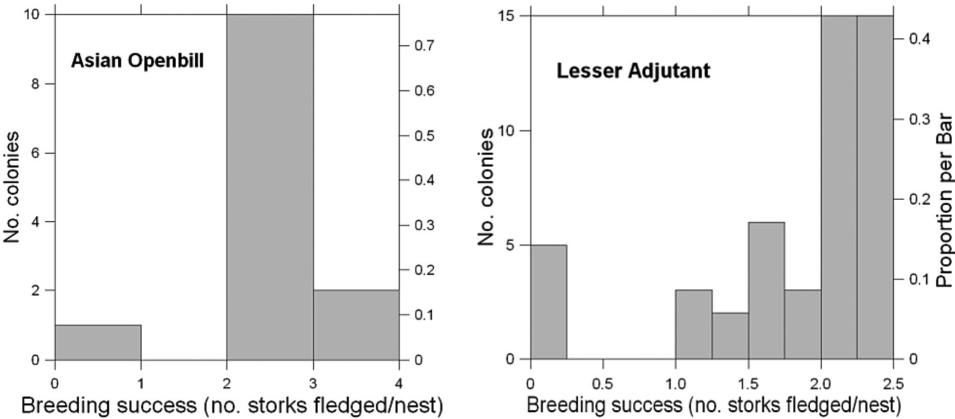


Figure S3. Frequency histograms of Asian Openbill and Lesser Adjutant breeding success (no. storks fledged per nest) response variables (see Table 1 for description of variable).

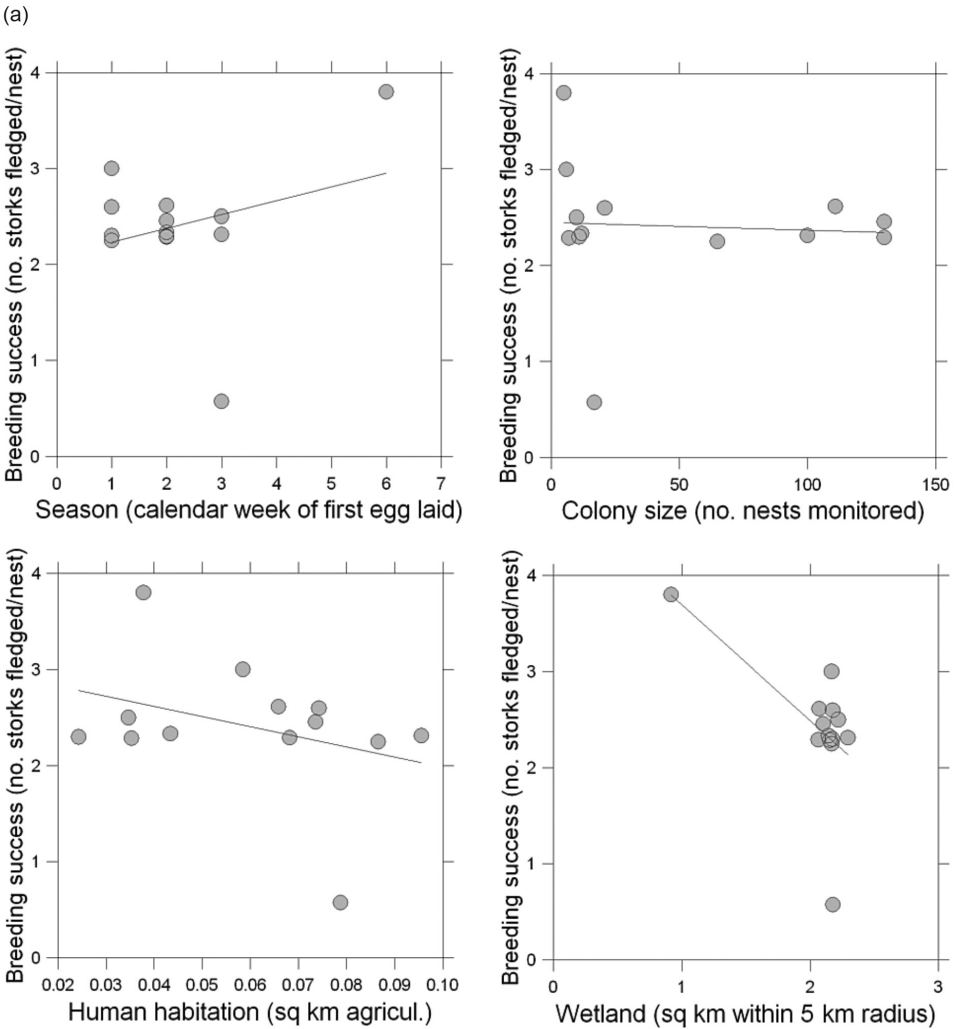


Figure S4. Scatter diagrams for Asian Openbill breeding success *vs.* covariates, with (a) best-fit linear regressions (see Table 1 for description of variables), (b) non-linear generalized additive models (GAM), and (c) evaluation of GAM models, showing poor fits as determined by residuals. Graphs for GAM models (b) show estimated smoothers for individual variables (see x-axis labels); smoothers are centred around zero. Breeding success was estimated as average number of chicks fledged per nest monitored at colonies.

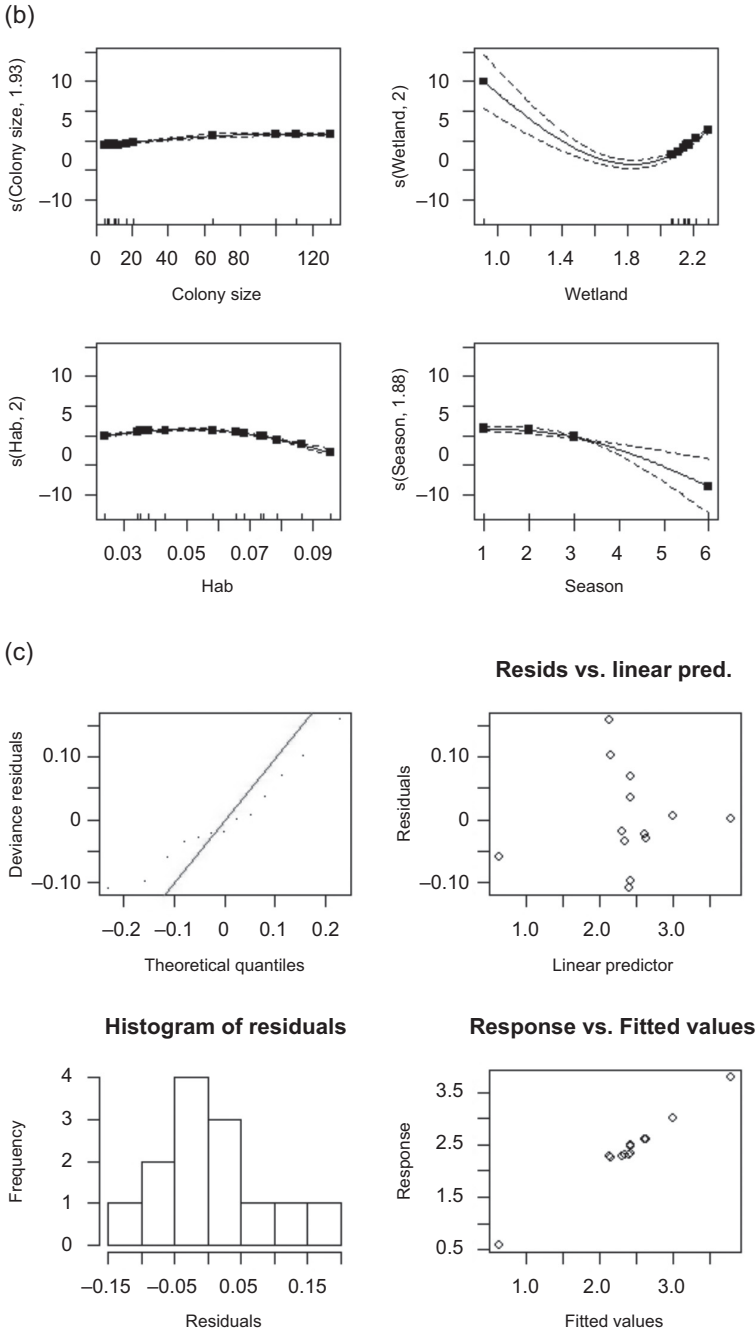


Figure S4 (continued).

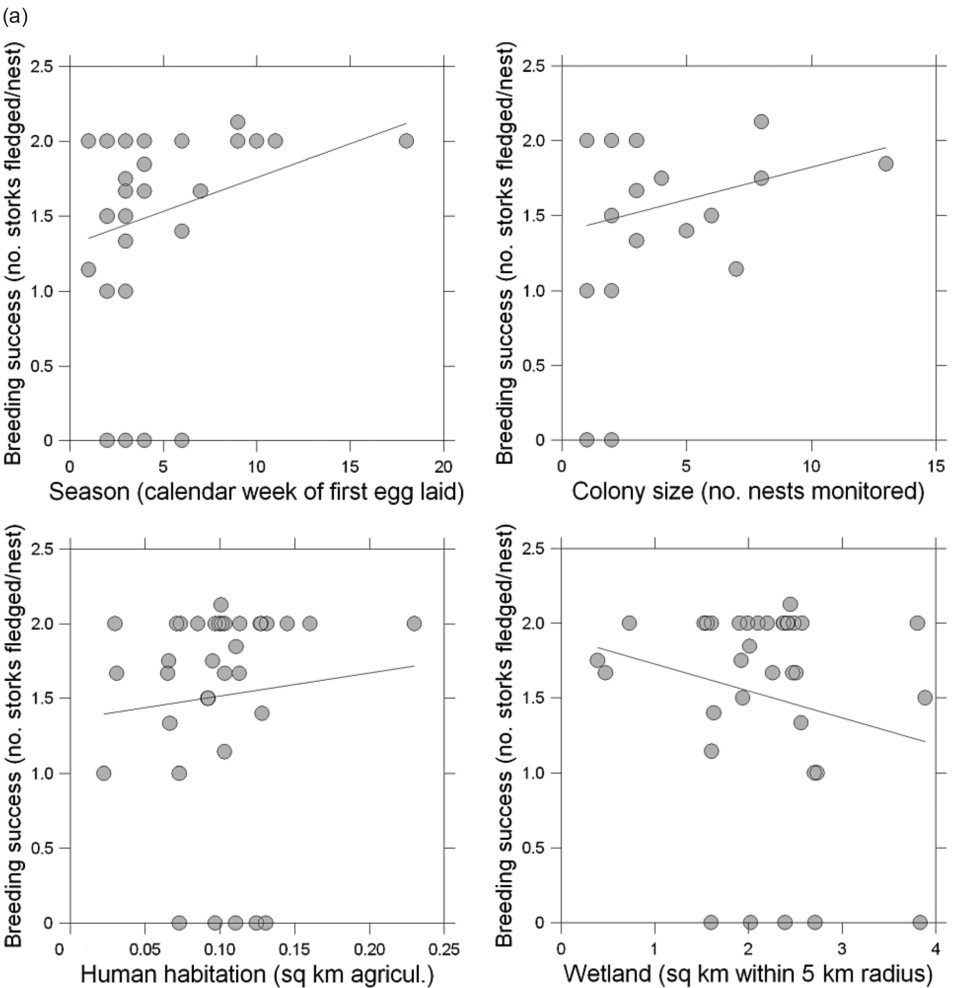


Figure S5. Scatter diagrams for Lesser Adjutant breeding success *vs.* covariates, with (a) best-fit linear regressions (see Table 1 for description of variables), (b) non-linear generalized additive models (GAM; b), and (c) evaluation of GAM models showing poor fits as determined by residuals. Graphs for GAM models (b) show estimated smoothers for individual variables (see x-axis labels); smoothers are centred around zero. Breeding success was estimated as average number of chicks fledged per nest monitored at colonies.

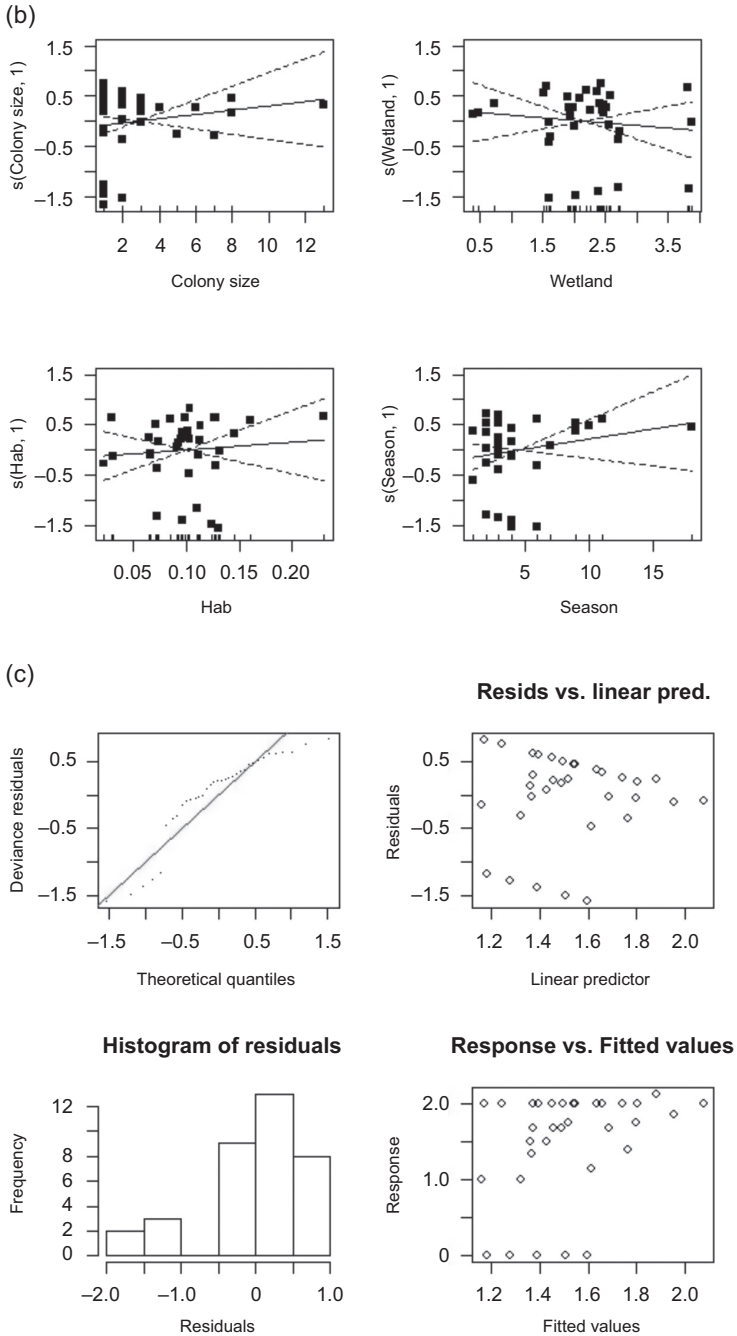


Figure S5 (continued).