# Drivers of predator-proof boma disrepair in the Amboseli Ecosystem, Kenya

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SUPPLEMENTARY TABLE 1 AIC values of all models for different analyses. For the main dataset, the initial model was fitted using cost-share level by boma owner, boma post type, livestock density, distance to nearest predator-proof boma, and boma circumference as predictors. homestead size, distance to nearest predator-proof boma, clustering of traditional bomas, and livestock density were included as predictors in the initial model for the second dataset. For both datasets, four analyses were conducted using proportions of damaged components (a), gates (b), posts (c) and chain-link fences (d) as dependent variables. In each analysis, the lower the AIC value, the higher the fit of the model.

Main dataset	(1) – Intercept-only model	(2) – Initial model	(3) – Model (2) + Clustering of traditional bomas	(4) – Model (3) + Distance to nearest protected area	(5) – Model (4) + Months since construction
Analysis 1a	404.956	383.596	390.518	410.939	416.077
Analysis 1b	381.380	422.205	429.710	451.027	456.887
Analysis 1c	434.036	419.413	425.945	445.739	450.384
Analysis 1d	390.238	415.308	422.100	444.300	450.303
Second dataset	(1) – Intercept-only model	(2) – Initial model	(3) – Model (2) + Distance to protected area	(4) – Model (3) + Extent of conflict	(5) – Model (4) + Months since construction
Analysis 2a	198.623	228.946	247.016	251.558	257.420
Analysis 2b	201.927	244.030	263.589	271.693	276.720
Analysis 2c	208.260	240.847	258.108	261.655	266.794
Analysis 2d	214.821	259.925	278.648	300.481	313.192
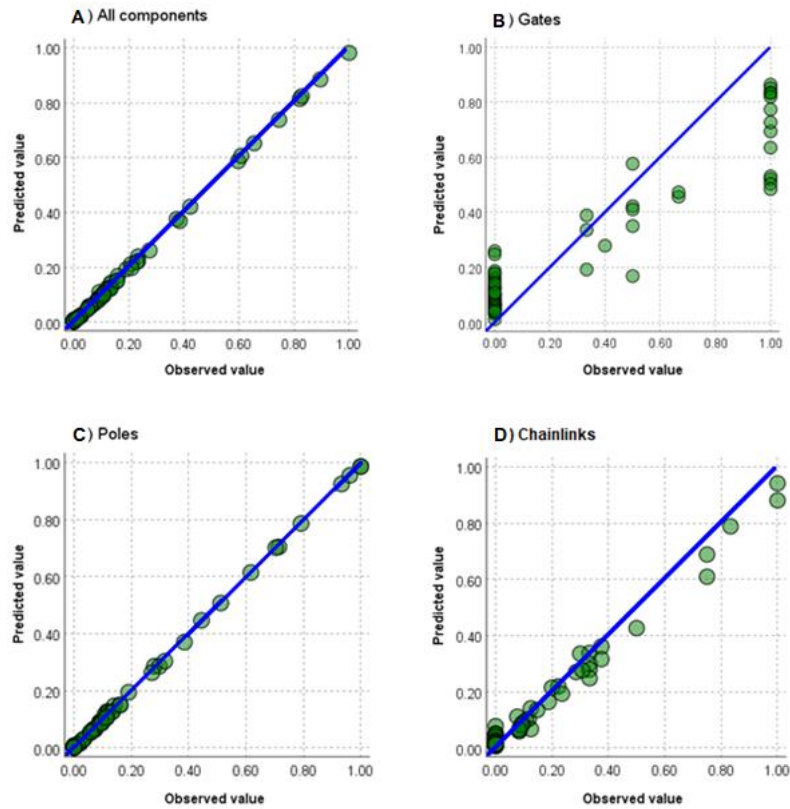
SUPPLEMENTARY FIG. 1 Binned scatter plots showing the relationships between the predicted values (*y*-axis) and the observed values (*x*-axis) for four models built using the main dataset (n = 86). The blue line (diagonal; 45°) represents the perfect prediction. Model fit was assessed based on how well the points lie on the diagonal line. Models A and C fitted the data well. Model B fitted the data poorly. For Model D, there was an acceptable fit of the data for most bins; these bins comprised the majority of data (i.e. data points with low proportions of damaged chain-link fences).
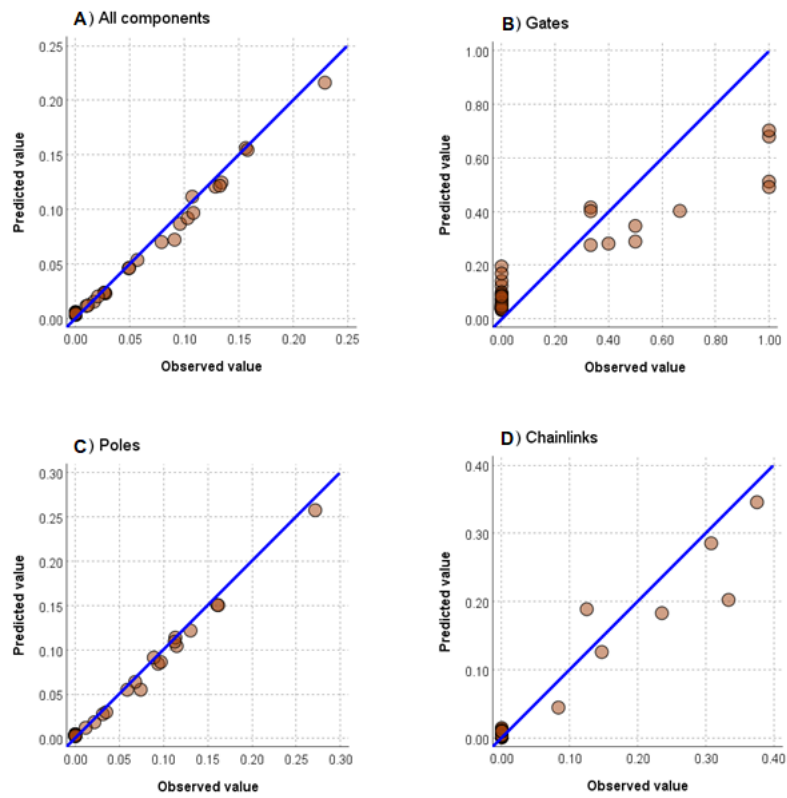
SUPPLEMENTARY FIG. 2 Binned scatter plots showing the relationships between the predicted values (*y*-axis) and the observed values (*x*-axis) for four models built using the second dataset (n = 47). The blue line (diagonal; 45°) represents the perfect prediction. Model fit was assessed based on how well the points lie on the diagonal line. Models A and C fitted the data well. Models B and D fitted the data poorly.

SUPPLEMENTARY TABLE 2 Detailed results of all generalized linear mixed model analyses.

2a – All components (n = 86).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp (Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-1.376	1.5651	-0.879	0.382	-4.492	1.741	0.253	0.011	5.701
Livestock density	-0.037	0.0165	-2.237	0.028	-0.070	-0.004	0.964	0.933	0.996
Distance to nearest predator-proof boma	9.027E-05	4.9893E-05	1.809	0.074	-9.078E-06	0.0002	1.000	1.000	1.000
Boma circumference	0.001	0.0024	0.393	0.695	-0.004	0.006	1.001	0.996	1.006
Cost-share level by boma owner (50%)	0.173	0.7248	0.238	0.812	-1.271	1.616	1.189	0.281	5.033
Cost-share level by boma owner (25%)	0								
Boma post type (plastic)	-2.941	0.8050	-3.654	0.0005	-4.544	-1.338	0.053	0.011	0.262
Boma post type (wooden)	0								
Clustering of traditional bomas	0.004	0.0151	0.273	0.786	-0.026	0.034	1.004	0.974	1.035
Distance to nearest protected area	-3.475E-06	2.0460E-05	-0.170	0.866	-4.422E-05	3.727E-05	1.000	1.000	1.000
Months since construction	0.022	0.0225	0.964	0.338	-0.023	0.066	1.022	0.977	1.069

2b – Gates (n = 85).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-1.646	1.0742	-1.533	0.129	-3.784	0.492	0.193	0.023	1.635
Livestock density	-0.030	0.0241	-1.230	0.222	-0.077	0.018	0.971	0.925	1.018
Distance to nearest predator-proof boma	0.0001	6.0835E-05	2.259	0.027	1.633E-05	0.0003	1.000	1.000	1.000
Boma circumference	0.004	0.0031	1.272	0.207	-0.002	0.010	1.004	0.998	1.010
Cost-share level by boma owner (50%)	1.544	0.9970	1.549	0.125	-0.441	3.529	4.684	0.644	34.077
Cost-share level by boma owner (25%)	0								
Boma post type (plastic)	-1.137	0.9076	-1.253	0.214	-2.944	0.669	0.321	0.053	1.953
Boma post type (wooden)	0								

2c – Posts (n = 86).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-1.242	2.0047	-0.620	0.537	-5.234	2.749	0.289	0.005	15.634
Livestock density	-0.051	0.0222	-2.293	0.025	-0.095	-0.007	0.950	0.909	0.993
Distance to nearest predator-proof boma	5.317E-05	6.7310E-05	0.790	0.432	-8.086E-05	0.0002	1.000	1.000	1.000
Boma circumference	0.0003	0.0031	0.091	0.928	-0.006	0.006	1.000	0.994	1.006
Cost-share level by boma owner (50%)	-0.037	0.9114	-0.041	0.967	-1.852	1.777	0.963	0.157	5.915
Cost-share level by boma owner (25%)	0								
Boma post type (plastic)	-3.232	1.0191	-3.171	0.002	-5.261	-1.203	0.039	0.005	0.300
Boma post type (wooden)	0								
Clustering of traditional bomas	-0.0001	0.0190	-0.007	0.995	-0.038	0.038	1.000	0.963	1.038
Distance to nearest protected area	-1.902E-05	2.6216E-05	-0.725	0.470	-7.122E-05	3.319E-05	1.000	1.000	1.000
Months since construction	0.037	0.0293	1.256	0.213	-0.022	0.095	1.038	0.979	1.100

2d – Chain-link fences (n = 86).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-1.433	2.0789	-0.689	0.493	-5.573	2.706	0.238	0.004	14.973
Livestock density	-0.014	0.0208	-0.654	0.515	-0.055	0.028	0.986	0.946	1.028
Distance to nearest predator-proof boma	0.0001	6.0000E-05	2.176	0.033	1.108E-05	0.0003	1.000	1.000	1.000
Boma circumference	0.0004	0.0032	0.129	0.898	-0.006	0.007	1.000	0.994	1.007
Cost-share level by boma owner (50%)	-0.427	0.9522	-0.448	0.655	-2.323	1.470	0.653	0.098	4.347
Cost-share level by boma owner (25%)	0								
Boma post type (plastic)	-2.812	1.0904	-2.579	0.012	-4.983	-0.640	0.060	0.007	0.527
Boma post type (wooden)	0								
Clustering of traditional bomas	-0.0004	0.0211	-0.017	0.986	-0.042	0.042	1.000	0.958	1.043
Distance to nearest protected area	3.976E-05	2.7312E-05	1.456	0.149	-1.462E-05	9.415E-05	1.000	1.000	1.000
Months since construction	-0.004	0.0293	-0.143	0.887	-0.063	0.054	0.996	0.939	1.056

2e – All components (n = 47).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-4.026	0.7702	-5.227	0.00001	-5.580	-2.472	0.018	0.004	0.084
Homestead size	-0.0003	0.0216	-0.015	0.988	-0.044	0.043	1.000	0.957	1.044
Distance to nearest predator-proof boma	0.0002	7.0835E-05	2.330	0.025	2.210E-05	0.0003	1.000	1.000	1.000
Clustering of traditional bomas	-0.009	0.0276	-0.317	0.753	-0.065	0.047	0.991	0.938	1.048
Livestock density	-0.017	0.0253	-0.662	0.512	-0.068	0.034	0.983	0.934	1.035

2f – Gates (n = 46).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-3.683	1.2321	-2.989	0.005	-6.171	-1.195	0.025	0.002	0.303
Homestead size	0.019	0.0275	0.687	0.496	-0.037	0.075	1.019	0.964	1.077
Distance to nearest predator-proof boma	0.0002	8.8705E-05	2.109	0.041	7.928E-06	0.0004	1.000	1.000	1.000
Clustering of traditional bomas	0.057	0.0366	1.557	0.127	-0.017	0.131	1.059	0.983	1.140
Livestock density	0.006	0.0353	0.184	0.855	-0.065	0.078	1.007	0.937	1.081

2g – Posts (n = 47).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-4.390	0.9171	-4.787	0.00002	-6.241	-2.539	0.012	0.002	0.079
Homestead size	-0.002	0.0257	-0.083	0.934	-0.054	0.050	0.998	0.947	1.051
Distance to nearest predator-proof boma	0.0002	8.2265E-05	1.915	0.062	-8.489E-06	0.0003	1.000	1.000	1.000
Clustering of traditional bomas	-0.016	0.0332	-0.471	0.640	-0.083	0.051	0.984	0.921	1.053
Livestock density	-0.007	0.0297	-0.228	0.821	-0.067	0.053	0.993	0.935	1.055

2h – Chain-link fences (n = 47).

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval		Exp(Coefficient)	95% Confidence Interval for Exp(Coefficient)	
					Lower	Upper		Lower	Upper
Intercept	-3.980	1.3024	-3.056	0.004	-6.608	-1.351	0.019	0.001	0.259
Homestead size	0.011	0.0296	0.388	0.700	-0.048	0.071	1.012	0.953	1.074
Distance to nearest predator-proof boma	0.0002	8.6042E-05	2.896	0.006	7.555E-05	0.0004	1.000	1.000	1.000
Clustering of traditional bomas	-0.012	0.0552	-0.224	0.824	-0.124	0.099	0.988	0.884	1.104
Livestock density	-0.063	0.0529	-1.183	0.244	-0.169	0.044	0.939	0.844	1.045

SUPPLEMENTARY TABLE 3 Summary of generalized linear mixed model results. Analyses were performed using the second dataset (n = 47). Detailed results with standard errors, test statistics and confidence intervals are presented in Supplementary Table 2e. All four predictors included in the model are quantitative. Significant terms are given in italics.

Model term	All components	
	Regression coefficient	P-value
Intercept	*–4.026*	*0.00001*
Homestead size	–0.0003	0.988
Distance to nearest predator-proof boma	*0.0002*	*0.025*
Clustering of traditional bomas	–0.009	0.753
Livestock density	–0.017	0.512