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Supplementary information

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Regional patterns of wild animal hunting in African tropical forests

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Supplementary Table 1 | Model estimates and uncertainty intervals. UI = Uncertainty Interval. ** denotes meaningful predictors at 95 % confidence, while * denotes when a predictor was meaningful at 89 % confidence, but not at 95 %. ~ denotes close to 89 %, but not at 89%. Rhat for all models was 1.00. Probability of Direction is also known as the Maximum Probability of Effect (MPE).

Response variable	Predictor variable (standardised)	Estimate	Est. error	Lower 95% UI	Upper 95% UI	Lower 89% UI	Upper 89% UI	Probability of direction (%)
Offtake (kg hunter^{-1} day^{-1})	Number of hunters surveyed **	-0.44	0.06	-0.57	-0.31	-0.54	-0.34	100.00
	Monitoring days	-0.07	0.08	-0.23	0.09	-0.20	0.06	81.90
	Proportion gun	0.07	0.08	-0.08	0.22	-0.05	0.20	82.19
	Distance to protected area *	-0.12	0.07	-0.26	0.02	-0.24	-0.01	95.45
	Human population density ~	0.12	0.08	-0.03	0.29	-0.01	0.26	93.35
	Subnational human development index ~	-0.13	0.09	-0.32	0.04	-0.28	0.01	93.35
	Proportion of village hunters **	0.21	0.08	0.04	0.37	0.08	0.34	99.16
	Forest condition **	0.26	0.08	0.09	0.42	0.12	0.38	99.85
	Proportion sold **	0.38	0.07	0.25	0.51	0.28	0.49	100.00
	Travel time to town**	0.20	0.10	0.01	0.39	0.04	0.35	97.69
Proportion sold	Number of hunters surveyed	0.11	0.11	-0.10	0.31	-0.06	0.27	84.15
	Monitoring days *	0.24	0.14	-0.05	0.52	0.01	0.46	94.88
	Year **	0.43	0.20	0.04	0.83	0.12	0.74	98.28
	Proportion of village hunters**	0.28	0.13	0.01	0.53	0.07	0.48	97.79
	Human population density ~	-0.14	0.10	-0.33	0.04	-0.30	0.01	93.31
	Subnational human development index	-0.26	0.19	-0.62	0.13	-0.56	0.05	90.83
	Travel time to town	0.02	0.12	-0.21	0.26	-0.16	0.21	56.68
	Year: Proportion of village hunters	0.01	0.13	-0.24	0.27	-0.19	0.21	51.17
Proportion gun	Number of hunters surveyed *	-0.27	0.16	-0.58	0.05	-0.52	-0.01	95.08
	Monitoring days	0.18	0.20	-0.22	0.59	-0.14	0.50	81.81
	Year *	0.46	0.29	-0.11	1.05	0.01	0.93	94.73
	Proportion of village hunters **	0.59	0.22	0.15	1.03	0.24	0.94	99.35
	Human population density	-0.07	0.13	-0.33	0.19	-0.28	0.14	68.76

	Travel time to town	-0.17	0.18	-0.53	0.17	-0.46	0.10	83.92
	Proportion sold *	0.21	0.12	-0.03	0.45	0.01	0.41	95.16
	Year: Proportion of village hunters *	0.35	0.21	-0.05	0.79	0.03	0.69	95.54
Adjusted species richness	Number of hunters surveyed	0.04	0.04	-0.04	0.12	-0.03	0.11	81.99
	Monitoring days **	0.15	0.06	0.04	0.27	0.06	0.24	99.45
	Proportion gun	-0.02	0.05	-0.12	0.07	-0.10	0.05	68.56
	Human population density	-0.02	0.05	-0.11	0.08	-0.10	0.06	62.39
	Distance to protected area	0.03	0.05	-0.07	0.13	-0.05	0.11	74.36
	Forest condition ~	0.06	0.05	-0.04	0.16	-0.02	0.14	86.79
	Travel time to town	-0.01	0.06	-0.13	0.11	-0.10	0.09	57.43
Duiker ratio	Number of hunters surveyed ~	-0.16	0.10	-0.36	0.05	-0.32	0.01	93.44
	Monitoring days	0.16	0.16	-0.16	0.47	-0.10	0.41	84.02
	Proportion gun *	-0.21	0.12	-0.44	0.02	-0.39	-0.02	96.19
	Human population density	-0.02	0.11	-0.24	0.19	-0.20	0.15	58.79
	Distance to protected area	0.09	0.12	-0.14	0.32	-0.10	0.28	77.45
	Forest condition	-0.04	0.11	-0.28	0.18	-0.23	0.13	64.77
	Travel time to town **	0.33	0.15	0.04	0.62	0.10	0.56	98.71
Ungulate:rodent ratio	Number of hunters surveyed	0.00	0.13	-0.25	0.26	-0.20	0.21	49.97
	Monitoring days	-0.13	0.18	-0.49	0.22	-0.42	0.15	76.61
	Proportion gun **	0.56	0.14	0.28	0.82	0.33	0.77	100.00
	Human population density	0.08	0.16	-0.22	0.40	-0.16	0.33	70.48
	Distance to protected area	-0.14	0.16	-0.46	0.18	-0.40	0.12	80.92
	Forest condition **	0.56	0.17	0.22	0.88	0.28	0.82	99.96
	Travel time to town	0.11	0.21	-0.30	0.52	-0.22	0.45	70.75
Proportion of primates	Number of hunters surveyed	-0.13	0.10	-0.33	0.07	-0.29	0.03	89.26
	Monitoring days	0.05	0.12	-0.19	0.29	-0.14	0.25	67.40
	Proportion gun **	0.36	0.10	0.17	0.55	0.20	0.52	100.00
	Human population density	-0.01	0.13	-0.28	0.22	-0.22	0.18	53.17

	Distance to protected area	0.08	0.12	-0.15	0.30	-0.11	0.26	75.04
	Forest condition	0.08	0.11	-0.14	0.30	-0.10	0.26	74.74
	Travel time to town	0.11	0.12	-0.13	0.34	-0.08	0.30	82.25

Supplementary Table 2 | Variables tested in the Bayesian models and used for summary statistics. Information includes the variable name and unit, year of the data, native data resolution, and the source reference and data availability.

Variable name (shortened)	Variable unit	Year of data	Resolution	Source
Time to town (Travel time)	Accessibility to urban areas with >10,000 people (measured as travel time in minutes; continuous)	2015	1 km	Weiss *et al*. (2018). A global map of travel time to cities to assess inequalities in accessibility in 2015. *Nature*, 553, 333-336. v201501 Downloaded: December 2020. Available at: https://data.malariaatlas.org/maps Calculated from: Nelson et al. (2019) A suite of global accessibility indicators. Sci Data 6, 266. v3 Downloaded: September 2021. Available at: https://figshare.com/articles/dataset/Travel_time_to_cities_and_ports_in_the_year_2015/7638134/3?file=14189807
Distance to protected area (km PA)	Distance to protected area (km continuous; excludes RAMSAR and UN MAB sites)	2021	1 km	Calculated from: UNEP-WCMC and IUCN (2021). Protected Planet: The World Database on Protected Areas (WDPA) [On-line], Cambridge, UK: UNEP-WCMC and IUCN. v1.6 Downloaded: February 2021. Available at: www.protectedplanet.net.
Forest cover (% forest)	Forest cover (%; mean within 20km)	2000; 2010	30 m	Hansen *et al*. (2013) High-resolution global maps of 21st-century forest cover change. *Science*, 342, 850-853. Downloaded: August 2021. Available at: https://glad.earthengine.app/
Forest condition	Forest integrity index (index between 0 and 10)	2019	300 m	Grantham *et al*. (2020) Anthropogenic modification of forests means only 40% of remaining forests have high ecosystem integrity. *Nature Communications*, 11, 5978. Downloaded: January 2023. Available at: https://www.forestintegrity.com/

Human population density (HPD)	Human population density (people km^{-2} mean within 20km)	2000; 2005; 2010; 2015; 2020	1 km	WorldPop Africa Continental Population Datasets (2000 - 2020) v2.0 Downloaded: August 2021. Available at: https://www.worldpop.org/geodata/summary?id=139
Human development (HDI)	Subnational Human Development Index (index, continuous)	Matched to study year.	Administrative level 1	Subnational Human Development Index, Global Data Lab. v5.0 Downloaded: November 2021. Available at: https://globaldatalab.org/shdi/shdi/
Year	Year (continuous)	NA	NA	Hunting studies used in analyses.
Offtake	Animal biomass harvested per hunter per day	NA	NA	Calculated from hunting studies used in analyses.
Proportion gun (% gun)	Hunting method (proportion; continuous)	NA	NA	Calculated from hunting studies used in analyses.
Proportion sold (% sold)	Use of carcass (proportion, continuous)	NA	NA	Calculated from hunting studies used in analyses.
Species richness (Richness)	Species richness (continuous)	NA	NA	Calculated from hunting studies used in analyses.
Proportion primates (% primates)	Proportion of harvested animals that were primates (proportion, continuous)	NA	NA	Calculated from hunting studies used in analyses.
Duiker ratio	The ratio of Cephalophus to Philantomba duikers (continuous)	NA	NA	Calculated from hunting studies used in analyses.
Ungulate: rodent ratio	The ratio of ungulates to rodents (continuous)	NA	NA	Calculated from hunting studies used in analyses.
Number of hunters surveyed	The number of hunters monitored (continuous)	NA	NA	Calculated from hunting studies used in analyses.
Monitoring days	The number of days hunters were monitored for (continuous)	NA	NA	Calculated from hunting studies used in analyses.

Supplementary Table 3 | *A priori* hypothesised relationships between predictor variables on outcome variables in the structural equation model component of the Bayesian multi-level models. A referenceID random effect is also added to each model to account for variation due to differences in the methods employed by researchers.

Outcome variable	Hypothesised relationship	Predictor variable	Description of hypothesis
All	+/-	Survey effort (Number of hunters monitored and monitoring days)	Lower effort means there is a higher likelihood of extreme values in either direction.
Mean daily hunter offtake	+	Proportion gun	Assuming gun hunting is more efficient, as the proportion of animals killed by gun increases, the average hunter daily offtake increases.
Mean daily hunter offtake	-	Distance to protected area	Assuming protected areas act as source populations (either through law enforcement to protect wildlife or possibly managed to allow some use), average hunter offtake decreases when a site is farther from a protected area.
Mean daily hunter offtake	+/-	Subnational human development	Either: 1) Lower subnational human development may mean hunters have a greater need for food or income (i.e., lower access to alternatives), so may hunt more and thus per hunter daily offtake could be higher, or 2) areas with higher human development may also have more environmental degradation and so may be more depleted of wildlife, so per hunter daily hunter offtake may be lower.
Mean daily hunter offtake	+/-	Proportion of village hunters	Either: 1) village hunters may use more efficient hunting methods, so may catch more per day, increasing mean daily hunter offtake, or 2) village hunters may spend more time engaging in agricultural activities or other employment, so may hunt less, and subsequently reduce mean daily hunter offtake.
Mean daily hunter offtake	+	Proportion sold	When hunters proportionally sell more of their offtake (i.e., a proxy for increased hunting for income), they may hunt more, and subsequently mean daily hunter offtake increases.
Mean daily hunter offtake	+/-	Travel time to town	Either / both: 1) higher biomass extracted closer to urban areas due to hunting to sell at market, or, 2) lower biomass extracted closer to urban areas due to alternative income and protein opportunities for hunters.
Mean daily hunter offtake	+	Forest condition	Assuming forests in good condition act as source populations, average hunter offtake increases when a site located in an area with better forest condition.
Mean daily hunter offtake	+/-	Human population density	Higher human population density could lead to more offtake to meet market demand or could lead to lower offtake if there are potentially more likely to be other food sources available.

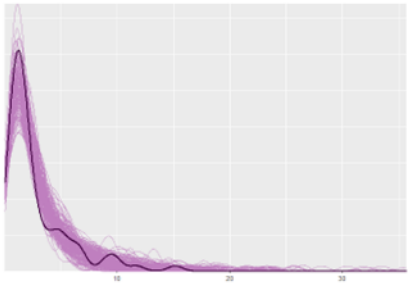
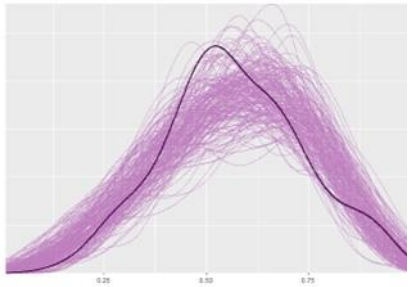
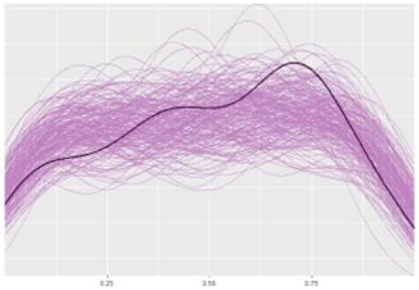
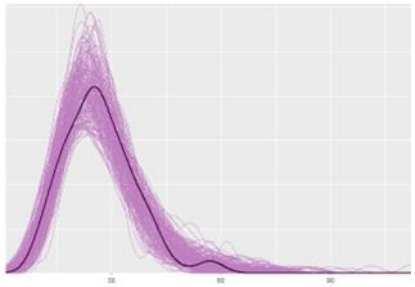
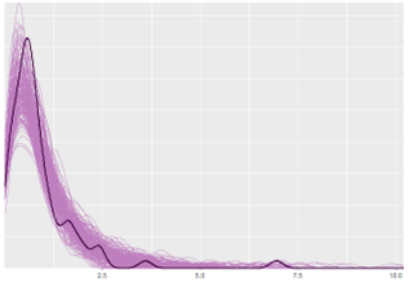
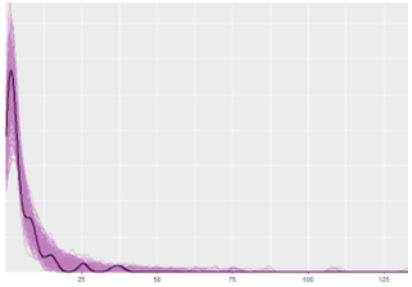
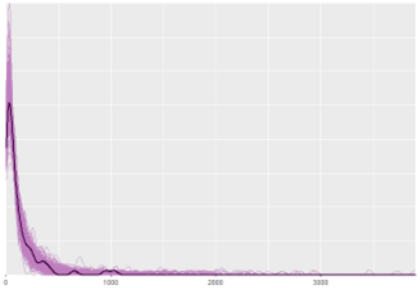
Proportion sold	+/-	Subnational human development	Either / both: 1) a greater proportion of offtake is sold as hunters may have more opportunities to sell wildmeat in more developed areas, or 2) a lesser proportion is sold as hunters may have other sources of income.
Proportion sold	-	Travel time to town	As travel time to urban area increases, hunters may sell a lower proportion of their offtake.
Proportion sold	+	Year*Proportion of village hunters	The proportion of animals sold may increase over time to fulfil demand from both rural and urban areas, particularly for village hunters who may have greater market access.
Proportion sold	+/-	Human population density	Either / both: 1) a greater proportion of offtake is sold as hunters may have more opportunities to sell wildmeat in more densely populated areas, or 2) a lesser proportion is sold as hunters may have other sources of income.
Proportion gun	+	Year*Proportion of village hunters	The proportion of animals killed by gun will increase over time as guns become more readily available, particularly for village hunters who may have greater access to guns.
Proportion gun	+	Proportion sold	When hunters proportionally sell more of their offtake (i.e., a proxy for increased hunting for income), they may hunt more with guns, assuming guns are more efficient.
Proportion gun	-	Travel time to town	In sites farther from towns, there may be less access to guns and more hunting with other methods such as snares (which may also be deemed unsafe nearer to towns).
Proportion gun	+	Human population density	Guns may be more accessible in areas with higher human population density.

Supplementary Table 4 | Summary of the multi-level Bayesian models, including information on the outcome variables, *a prior* hypothesised predictor (standardised), varying intercepts included, and the distribution used. The referenceID varying intercept groups multiple studies when they come from the same source. The | ID | formulation specifies which random effects terms should be modeled as correlated, supporting the partial pooling property of random effects models. Simply put, all random effects terms with the same indicator name (here "ID") will be modeled as correlated. The indicator name itself is arbitrary. Results for Moran's I test for distance-based autocorrelation is also presented.

Outcome variable	**Included *a prior* hypothesised predictor (standardised)**	**Varying intercepts**	**Distribution**	**Moran's I (p-value)**
Mean daily hunter offtake	Number of hunters surveyed + monitoring days + proportion gun + distance to protected area + subnational human development index + proportion of village hunters + forest condition + proportion sold + travel time to town + human population density	1 |ID| referenceID	Gamma (link="log")	0.057
Proportion sold	Number of hunters surveyed + monitoring days + year*proportion of village hunters + subnational human development index + travel time to town + human population density	1 |ID| referenceID	Beta (link="logit")	0.831
Proportion gun	Number of hunters surveyed + monitoring days + year*proportion of village hunters + travel time to town + proportion sold + human population density	1 |ID| referenceID	Beta (link="logit")	0.151
Adjusted species richness	Number of hunters surveyed + monitoring days + proportion gun + distance to protected area + forest condition + travel time to town + human population density	1 |ID| referenceID	Negative binomial (link="log")	0.986
Duiker ratio	Number of hunters surveyed + monitoring days + proportion gun + distance to protected area + forest condition + travel time to town + human population density	1 |ID| referenceID	Gamma(link="log")	0.399
Ungulate:rodent ratio	Number of hunters surveyed + monitoring days + proportion gun + distance to protected area + forest condition + travel time to town + human population density	1 |ID| referenceID	Gamma(link="log")	0.572

Proportion of primates	Number of hunters surveyed + monitoring days + proportion gun + distance to protected area + forest condition + travel time to town + human population density	1 |ID| referenceID	Beta Binomial (link="logit")	0.407

Supplementary Table 5 | Graphical diagnostic checks of the predictive distribution for model performance. Black = data, purple = model draws.

Offtake	**Sold**	**Gun**	**Richness**
			
Duiker Ratio	**Ungulate: rodent ratio**	**Primates**	
			

Supplementary Table 6 | Model estimates and uncertainty intervals, where the response was weighted by the number of hunters surveyed (see *Methods*). UI = Uncertainty Interval. ** denotes meaningful predictors at 95 % confidence, while * denotes when a predictor was meaningful at 89 % confidence, but not at 95 %. ~ denotes close to 89 %, but not at 89%. Rhat for all models was 1.00. Difference is the change in the level of support of a variable from the unweighted to the weighted model.

Response variable	Predictor variable (standardised)	Estimate	Est. error	Lower 95% UI	Upper 95% UI	Lower 89% UI	Upper 89% UI	Difference
Offtake (kg hunter^{-1} day^{-1})	Number of hunters surveyed **	-0.34	0.05	-0.43	-0.25	-0.41	-0.26	No change
	Monitoring days	-0.08	0.08	-0.23	0.08	-0.20	0.05	No change
	Proportion gun *	0.11	0.06	-0.01	0.23	0.01	0.21	NS to *
	Distance to protected area **	-0.16	0.06	-0.27	-0.04	-0.25	-0.06	* to **
	Subnational human development index **	-0.25	0.09	-0.42	-0.08	-0.39	-0.11	NS to **
	Proportion of village hunters	0.13	0.11	-0.10	0.32	-0.05	0.29	** to NS
	Forest condition **	0.31	0.06	0.19	0.42	0.22	0.40	No change
	Proportion sold **	0.29	0.05	0.20	0.38	0.22	0.36	No change
	Travel time to town	0.07	0.08	-0.08	0.22	-0.06	0.19	** to NS
	Human population density **	0.13	0.05	0.04	0.22	0.06	0.21	NS to **
Proportion sold	Number of hunters surveyed ~	0.11	0.07	-0.03	0.26	-0.00	0.23	No change
	Monitoring days	0.15	0.13	-0.10	0.41	-0.05	0.36	* to NS
	Year *	0.37	0.20	-0.03	0.76	0.05	0.68	** to *
	Proportion of village hunters	0.11	0.15	-0.19	0.39	-0.13	0.33	** to NS
	Subnational human development index	-0.01	0.14	-0.29	0.28	-0.24	0.22	No change
	Travel time to town	0.10	0.10	-0.09	0.31	-0.06	0.27	No change
	Year: Proportion of village hunters	0.11	0.12	-0.12	0.34	-0.07	0.29	No change
	Human population density ~	-0.08	0.05	-0.18	0.02	-0.16	0.00	No change
Proportion gun	Number of hunters surveyed *	-0.18	0.10	-0.39	0.02	-0.35	-0.02	No change
	Monitoring days ~	0.31	0.20	-0.08	0.73	-0.01	0.65	No change
	Year	0.42	0.35	-0.25	1.12	-0.12	0.98	* to NS
	Proportion of village hunters *	0.45	0.26	-0.07	0.94	0.04	0.85	** to *

	Travel time to town ~	-0.21	0.14	-0.49	0.06	-0.43	0.01	No change
	Proportion sold *	0.15	0.08	-0.01	0.32	0.02	0.29	No change
	Year: Proportion of village hunters **	0.58	0.20	0.19	0.97	0.26	0.89	* to **
	Human population density	-0.03	0.07	-0.17	0.10	-0.14	0.07	No change
Adjusted species richness	Number of hunters surveyed	0.02	0.02	-0.03	0.07	-0.02	0.06	No change
	Monitoring days **	0.15	0.06	0.05	0.26	0.06	0.24	No change
	Proportion gun	-0.02	0.03	-0.09	0.05	-0.07	0.04	No change
	Distance to protected area ~	0.06	0.04	-0.02	0.13	-0.00	0.11	No change
	Forest condition **	0.08	0.03	0.02	0.15	0.03	0.13	NS to **
	Travel time to town	0.02	0.05	-0.07	0.12	-0.05	0.10	No change
	Human population density	0.02	0.02	-0.02	0.07	-0.01	0.06	No change
Duiker ratio	Number of hunters surveyed *	-0.11	0.06	-0.22	0.00	-0.20	-0.02	NS to *
	Monitoring days *	0.24	0.15	-0.04	0.52	0.00	0.47	NS to *
	Proportion gun **	-0.27	0.08	-0.42	-0.12	-0.39	-0.15	* to **
	Distance to protected area	-0.02	0.08	-0.17	0.13	-0.15	0.10	No change
	Forest condition	0.00	0.07	-0.15	0.14	-0.12	0.12	No change
	Travel time to town **	0.26	0.11	0.05	0.47	0.09	0.43	No change
	Human population density	-0.00	0.06	-0.12	0.11	-0.10	0.09	No change
Ungulate:rodent ratio	Number of hunters surveyed	0.06	0.08	-0.10	0.21	-0.07	0.18	No change
	Monitoring days *	-0.29	0.16	-0.62	0.01	-0.55	-0.05	NS to *
	Proportion gun **	0.54	0.11	0.32	0.75	0.36	0.71	No change
	Distance to protected area	-0.16	0.13	-0.40	0.09	-0.36	0.04	No change
	Forest condition **	0.67	0.11	0.45	0.90	0.49	0.86	No change
	Travel time to town	-0.03	0.15	-0.34	0.27	-0.28	0.21	No change
	Human population density **	0.19	0.08	0.02	0.35	0.05	0.32	NS to **
Proportion of primates	Number of hunters surveyed	-0.13	0.10	-0.34	0.06	-0.30	0.03	No change
	Monitoring days	0.04	0.12	-0.20	0.27	-0.15	0.23	No change
	Proportion gun **	0.34	0.10	0.15	0.55	0.18	0.51	No change

	Distance to protected area	0.09	0.12	-0.14	0.31	-0.09	0.28	No change
	Forest condition	0.06	0.11	-0.16	0.29	-0.12	0.24	No change
	Travel time to town	0.11	0.12	-0.12	0.33	-0.08	0.29	No change
	Human population density	-0.02	0.13	-0.28	0.22	-0.22	0.18	No change

Supplementary List 1 | Study reference list

Abernethy, K., Coad, L., Llambu, O., Makiloutila, F., Easton, J., Akiak, J. (2010). Wildlife hunting, consumption trade in the Oshwe sector of the Salonga-Lukenie- Sankuru Landscape, DRC. WWF.

Abugiche, S.A. (2008). Impact of hunting and bushmeat trade on biodiversity loss in Cameroon: a case study of the Banyang-Mbo Wildlife Sanctuary. PhD Thesis, Brandenburg University of Technology, Germany. Available at: urn:nbn:de:kobv:co1-opus-9550

Allebone-Webb, S. M. (2009). Evaluating dependence on wildlife products in rural Equatorial Guinea. PhD Thesis, Imperial College London, UK. Available at: https://iccs.org.uk/wp-content/uploads/2023/08/Allebone-Webb-Submitted2009.pdf

Avila Martin, E., Brull, G. R., Funk, S. M., Luiselli, L., Okale, R., Fa, J. E. (2020). Wild meat hunting and use by sedentarised Baka Pygmies in southeastern Cameroon. PeerJ, 8, e9906. DOI: https://doi.org/10.7717/peerj.9906

Bolle, R.K. (2001). Etude de la chasse villageoise dans la peripherie nord du Parc National de Campo Ma'an: Cas du secteur Akom II. Rapport, Projet Campo Ma'an, Cameroon.

Coad, L., Schleicher, J., Milner-Gulland, E.J., Marthews, T. R., Starkey, M., Manica, A., Balmford, A., Mbombe, W,. Diop Bineni, T. R., Abernethy, K. A. (2013). Social and ecological change over a decade in a village hunting system, Central Gabon. Conservation Biology, 27, 270–280. DOI: https://doi.org/10.1111/cobi.12012

Coad, L. (2013). Unpublished bushmeat hunting data from two sites in Gabon in 2013 (collected using the same methodology as Coad et al. 2013). University of Oxford, UK.

Cornélis, D., van Vliet, N., Nguinguiri, J.-C., Gaidet, N., Ayaya, I., Broussolle, L., Fagot, R., Granier, E., Houngbegnon, F., Sandrin, F., Vanegas, L., Yapi, F., Ampolo, A., Bivigou, A., Mbuyi Bilonda, B., Le Bel, S. (2021). "Hunting offtake dataset of the project "Sustainable Management of the Wildlife and Bushmeat Sector in Central Africa", CIRAD Dataverse, V1. DOI: https://doi.org/10.18167/DVN1/SGAKNY

Dethier, M., Ghuirghi, A. (2000). Etude de la chasse villageoise dans le secteur Ouest (route Mambélé-Ndelé) de la zone d 'intervention du projet ECOFAC. Bangui (RCA), Ministère de l'Environnement, Eaux, Forêts, Chasses et Pêches, ECOFAC, Republique Centrafricaine.

Dounias, E. (1999). Le câble pris au piège de la conservation. Technologie du piégeage et production cynégétique chez les Mvae du sud Cameroun forestier. Pp 281-300. In: L'homme et la foret tropicale (eds. S. Bahuchet, D. Bley, H. Pagezy, N. Vernazza-Licht). Éditions de Bergier, Châteauneuf de Grasse, France. Available at: https://www.documentation.ird.fr/hor/fdi:010023531

Ekodeck, H. G. (2003). Etude de la chasse villageoise en peripherie nord de la Reserve de Faune du Dja: cas des terroirs villageois de Ntibonkeuh et Nemeyong II. Projet Forets Communautaires du Dja, Yaoundé, Cameroun.

Fa, J.E., Yuste, J.E.G. (2001). Commercial bushmeat hunting in the Monte Mitra forests, Equatorial Guinea: extent and impact. Anim. Biodivers. Conserv., 24.1, 31–52. ISSN: 1578–665X. Available at: https://museucienciesjournals.cat/en/abc/issue/24-1-2001-abc/commercial-bushmeat-hunting-in-the-monte-mitra-forests-equatorial-guinea-extent-and-impact

Froese, G. Z. L., Ebang Mbélé, A., Beirne, C., Atsame, L., Bayossa, C., Bazza, B., Bidzime Nkoulou, M., Dzime N'noh, S., Ebeba, J., Edzidzie, J., Ekazama Koto, S., Imbomba, S., Mandomobo Mapio, E., Mandou Mabouanga, H. G., Mba Edang, E., Landry Metandou, J., Mossindji, C., Ngoboutseboue, I., Nkwele, C., Nzemfoule, E., Elie, B. S., Sergent, A.-P., Poulsen, J. R. (2022). Coupling paraecology and hunter GPS self-follows to quantify village bushmeat hunting dynamics across the landscape scale. African Journal of Ecology, 60, 229– 249. DOI: https://doi.org/10.1111/aje.12956

Gill, D. J. C., Fa, J. E., Rowcliffe, J. M., Kümpel, N. F. (2012). Drivers of change in hunter offtake and hunting strategies in Sendje, Equatorial Guinea. Conservation Biology, 26, 1052-1060. DOI: 10.1111/j.l 523-1739.2012.01876.x

Greengrass, E. (2011). Exploring the dynamics of bushmeat hunting and trade in Sapo National Park. Fauna & Flora International, Cambridge, UK.

Kümpel, N. F. (2006). Incentives for sustainable hunting of bushmeat in Río Muni, Equatorial Guinea. PhD Thesis, Imperial College London, UK. Available at: http://hdl.handle.net/10044/1/11266

Lupo, K. D., Schmitt, D. N. (2017) How do meat scarcity and bushmeat commodification influence sharing and giving among forest foragers? A view from the Central African Republic. Human Ecology, 45, 627–641. DOI: https://doi.org/10.1007/s10745-017-9933-2

Ngueguim, J. R. (2001). Etude de la chasse villageoise dans l'unite technique operationnelle Campo-Ma'an: Cas du secteur Bifa. Rapport, Projet Campo Ma'an, Cameroon.

Nguetsop, J. D. (2001). Etude de la chasse villageoise dans la peripherie Sud-Ouest de l'unite technique operationnelle de Campo-Ma'an: Cas du secteur Campo. Rapport, Projet Campo Ma'an, Cameroon.

Ondo née Ntyam, S. C. (2001). Etude de la chasse villaeoise dans l'unite technique operationnelle Campo-Ma'an. Cas de villages: Nyabizan, Abem, Alen II et Nnemeyong. Rapport, Projet Campo Ma'an, Cameroon.

Ondo Obiang, B. (2001). Etude de la chasse villaeoise dans l'unite technique operationnelle Campo-Ma'an. Cas de villages: Nkongmeyos, Alen et Zoetele. Rapport, Projet Campo Ma'an, Cameroon.

Rieu, L. (2004). Du chasseur au consommateur: Organisation de la filière viande de brousse dans un site industriel forestier d'Afrique Centrale. CIRAD-EMVT / Université Montpellier II, France.

Solly, H. (2003). The implications of Bulu history, culture and economy for an Integrated Conservation and Development Project (ICDP) in the Dja Reserve, Cameroon. PhD Thesis, Universite Libre de Bruxelles, Belgium.

Cornelis, D., Vanthomme, H., Assio, C., Cornu, G., Dibotty, S., Fonteyn, D., Gafari, A., Groschene, M., Hega, M., Horion, R., Leyanga, U. A., Malignat, R., Mamboundou Kouima, G. L., Massoukou, L., Moubagou, Y.-É., Ngwapaza, M. E., Ntie, S., Ossele, J., Otchika, B. C., Pereira Dias, S., Verbeke, M., Yia Okanabene, M. N., Vigneron, P. (2023) Hunting offtake dataset of the project "Sustainable Wildlife Management" in Gabon (Mulundu Department). CIRAD Dataverse, V1, UNF:6:xgnfU2U3FFB+GVAenyC9ZA== [fileUNF]. Available at: https://doi.org/10.18167/DVN1/75ZDAM

van Vliet, N. (2008). Variabilite spatiale et temporelle au sein du systeme “chasseur-animal-territoire de chasse villageois” - pour une approche geographique de l’estimation de la durabilite de la chasse en Afrique Centrale- cas de Cephalophus spp. du Nord-est Gabon. PhD Thesis, Université Toulouse Le Mirail, France.

Willcox, A. S., Nambu, D. M. (2007). Wildlife hunting practices and bushmeat dynamics of the Banyangi and Mbo people of southwestern Cameroon. Biological Conservation, 134, 251–261. DOI: https://doi.org/10.1016/j.biocon.2006.08.016.