

Improved region-specific emission factors for enteric methane emissions from cattle in smallholder mixed crop: livestock systems of Nandi County, Kenya

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Table S1. Seasonal 1st quartiles, mean and 3rd quartiles for metabolisable energy requirements (MER MJ/day) for maintenance (MER_M), weight gain/loss (MER_{G/L}), travel (MER_T) and total MER of males (>2y) in lower highland 1(LH1), lower highland 2 (LH2) and upper midlands (UM) of Nandi County, Kenya

	Short Rains Season				Hot Dry Season				Long Rains Season				Cold Dry Season			
	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER
Lower highland 1																
1st Quartile	36.26	2.18	2.44	37.77	34.91	4.69	2.35	37.25	44.26	8.18	3.33	57.45	44.34	7.99	3.39	55.89
Mean	42.59	8.18	3.20	56.44	40.92	7.28	3.04	46.79	46.01	14.25	3.59	68.01	46.50	9.72	3.69	59.59
3rd Quartile	44.52	20.07	3.90	73.68	45.34	9.83	3.39	54.51	47.11	20.56	3.71	74.65	48.37	10.49	3.94	62.83
Lower highland 2																
1st Quartile	39.80	6.41	7.05	51.69	41.76	-13.52	7.21	49.07	41.14	8.48	7.27	53.50	43.90	7.61	8.98	60.67
Mean	48.18	19.32	8.57	66.40	49.34	-7.64	8.86	53.32	46.89	12.05	8.60	64.33	49.56	10.44	9.33	66.52
3rd Quartile	56.86	30.43	10.93	76.25	57.16	-0.59	10.40	59.49	49.45	16.32	9.47	73.98	50.90	10.67	9.92	73.84
Upper midlands																
1st Quartile	33.38	10.14	5.19	47.04	34.99	-4.36	5.25	36.61	38.72	7.99	5.42	50.31	40.02	8.27	6.04	48.25
Mean	38.17	12.85	6.01	52.29	38.45	-2.76	6.14	41.29	41.54	10.30	6.41	53.90	43.55	12.60	6.96	55.11
3rd Quartile	44.18	12.43	7.18	55.33	41.38	-0.82	6.81	44.92	43.58	12.70	6.89	59.66	45.77	16.14	7.51	61.44
Total Nandi																
1st Quartile	36.16	8.25	4.57	47.04	36.41	-5.27	4.47	38.99	39.85	8.48	5.35	50.38	41.42	7.65	5.67	49.52
Mean	2.15	14.27	6.22	57.48	42.39	-2.69	6.31	46.60	44.00	11.47	6.78	59.08	45.99	11.20	7.27	59.89
3rd Quartile	45.50	19.51	7.43	65.73	46.47	2.19	7.62	52.49	47.48	16.32	8.10	62.92	49.73	14.33	9.04	68.17

Table S2. Seasonal 1st quartiles, mean and 3rd quartiles for metabolisable energy requirements (MER MJ/day) for maintenance (MER_M), weight gain/loss (MER_{G/L}), travel (MER_T) and total MER of heifers (>2y) in lower highland 1 (LH1), lower highland 2 (LH2) and upper midlands (UM) of Nandi County, Kenya

	Short Rains Season				Hot Dry Season				Long Rains Season				Cold Dry Season			
	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER
Lower highland 1																
1st Quartile	20.20	8.40	1.85	29.48	20.70	-1.22	1.88	27.32	20.08	4.15	1.83	24.74	2.36	6.32	1.89	27.44
Mean	23.96	13.66	2.40	39.00	25.48	6.07	2.49	33.91	25.12	10.62	2.50	34.88	26.37	10.53	2.59	37.34
3rd Quartile	27.21	19.04	2.83	48.09	28.91	12.37	3.01	38.76	29.01	14.95	3.10	42.82	30.05	15.03	3.25	46.32
Lower highland 2																
1st Quartile	17.06	8.91	3.10	26.52	18.43	4.42	3.76	23.97	18.56	0.14	3.74	29.38	18.85	5.61	3.91	26.86
Mean	21.02	14.01	4.49	36.14	22.39	9.25	4.86	31.47	22.16	6.92	4.93	33.81	23.06	9.44	5.18	34.63
3rd Quartile	24.38	21.04	5.40	45.95	25.57	13.72	5.71	34.74	24.61	13.05	5.12	39.35	26.36	16.11	6.24	37.41
Upper midlands																
1st Quartile	14.01	4.06	2.31	25.64	15.30	0.55	2.48	22.38	17.62	1.80	3.18	29.89	18.02	1.20	2.82	24.07
Mean	18.90	9.83	3.42	31.98	19.32	5.49	3.51	28.62	21.39	6.65	3.89	38.29	21.66	6.03	3.99	35.84
3rd Quartile	23.94	15.66	4.32	39.22	24.79	9.46	4.44	33.05	24.75	15.53	4.31	46.58	27.07	9.70	4.74	44.99
Total Nandi																
1st Quartile	19.31	8.19	2.05	29.13	19.39	-0.23	2.03	25.76	19.06	2.75	2.00	25.90	20.01	5.36	2.06	26.87
Mean	22.98	13.58	2.86	37.84	24.41	6.39	2.98	33.03	24.25	9.44	3.04	35.05	25.18	9.76	3.23	36.67
3rd Quartile	26.71	19.04	3.39	46.98	28.52	12.56	3.45	38.53	28.59	14.60	3.64	42.88	29.22	14.89	4.02	44.88

Table S3. Seasonal 1st quartiles, mean and 3rd quartiles for metabolisable energy requirements (MER MJ/day) for maintenance (MER_M), weight gain/loss (MER_{G/L}), travel (MER_T) and total MER of young males (>2y) in lower highland 1(LH1), lower highland 2 (LH2) and upper midlands (UM) of Nandi County, Kenya

	Short Rains Season				Hot Dry Season				Long Rains Season				Cold Dry Season			
	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER	MER _M	MER _{G/L}	MER _T	Total MER
Lower highland 1																
1st Quartile	27.82	6.67	1.64	34.23	28.95	5.01	1.63	35.24	29.38	3.42	1.73	35.27	26.69	3.14	1.57	33.46
Mean	31.35	11.65	2.00	41.82	33.19	8.34	2.11	42.00	33.91	7.72	2.19	40.35	31.67	7.37	2.02	39.16
3rd Quartile	34.44	15.31	2.24	47.84	37.30	10.56	2.46	45.85	36.27	11.64	2.44	43.52	35.01	11.10	2.31	43.35
Lower highland 2																
1st Quartile	23.34	13.69	2.93	28.55	28.06	-1.01	3.67	33.07	29.00	9.05	3.98	33.07	31.23	8.39	2.49	40.26
Mean	27.25	17.39	3.68	40.41	31.24	5.64	4.29	39.63	31.13	11.94	4.39	39.63	32.92	13.33	3.50	45.95
3rd Quartile	29.05	22.09	3.92	44.69	31.61	10.17	4.32	44.19	32.36	16.69	4.69	44.19	35.52	17.46	5.23	50.70
Upper midlands																
1st Quartile	-	-	-	-	24.47	5.87	2.43	32.76	22.76	7.37	1.73	32.76	26.36	5.52	1.73	31.22
Mean	-	-	-	-	24.88	8.29	2.49	35.66	23.18	13.80	2.87	35.66	30.51	12.79	2.87	41.08
3rd Quartile	-	-	-	-	25.30	10.71	2.55	38.56	29.08	21.30	4.14	38.56	34.17	20.91	4.14	52.40
Total Nandi																
1st Quartile	25.40	6.99	1.76	33.46	28.60	4.46	1.90	34.47	27.89	3.72	1.84	35.25	26.87	3.37	1.63	34.39
Mean	30.33	12.80	2.42	41.47	33.88	7.78	2.61	41.21	31.86	9.37	2.67	41.31	31.58	8.90	2.35	40.40
3rd Quartile	34.37	16.91	2.83	46.26	38.75	10.65	2.98	45.70	35.55	12.74	3.18	45.57	35.04	12.51	2.58	45.27

- There were no young males in Upper midlands during the short dry season hence no data.

Table S4. Seasonal 1st quartiles, mean and 3rd quartiles for metabolisable energy requirements (MER MJ/day) for maintenance (MER_M), weight gain/loss (MER_{G/L}), travel (MER_T) and total MER of calves (>2y) in lower highland 1(LH1), lower highland 2 (LH2) and upper midlands (UM) of Nandi County, Kenya

	Short Rains Season			Hot Dry Season			Long Rains Season			Cold Dry Season		
	MER _M	MER _{G/L}	Total MER	MER _M	MER _{G/L}	Total MER	MER _M	MER _{G/L}	Total MER	MER _M	MER _{G/L}	Total MER
Lower highland 1												
1st Quartile	11.15	7.28	13.80	22.94	4.42	25.33	21.75	5.09	23.88	18.89	4.40	21.69
Mean	14.65	11.35	22.68	33.69	7.44	39.14	32.44	8.33	37.74	30.29	8.29	35.83
3rd Quartile	17.46	14.47	29.40	44.31	9.93	51.65	40.91	10.91	50.19	38.26	11.44	46.67
Lower highland 2												
1st Quartile	10.01	7.48	14.24	19.97	4.35	23.30	16.34	5.33	16.50	16.87	3.39	17.77
Mean	13.90	10.34	21.09	28.85	7.09	33.71	26.99	8.21	32.32	28.13	7.80	34.00
3rd Quartile	15.91	12.59	26.76	35.02	8.29	40.83	35.83	11.19	45.34	38.51	9.69	46.90
Upper midlands												
1st Quartile	9.05	6.14	11.92	18.62	6.59	23.39	17.51	5.81	20.64	27.89	4.86	19.94
Mean	12.68	9.66	19.45	30.80	9.46	38.91	27.39	8.27	33.71	30.13	9.82	37.55
3rd Quartile	16.55	13.17	26.42	44.07	12.45	51.64	36.68	10.20	47.75	37.07	11.91	51.29
Total Nandi												
1st Quartile	9.86	7.11	13.76	20.03	4.51	24.29	18.41	5.25	21.56	18.02	4.31	19.95
Mean	13.49	7.62	21.67	29.43	7.62	37.74	28.40	8.29	35.81	28.69	8.33	35.11
3rd Quartile	16.27	13.99	29.02	36.94	10.07	49.57	35.72	10.91	49.14	37.32	11.26	46.90

Table S5. Dry matter intake (DMI kg) and daily methane production (DMP g/d) of females (>2y), males (>2y), heifers (1-2y), young males (1-2) and calves (<1y) across Lower highland 1, Lower highland 2 and -Upper midlands zones in short rains, hot dry, long rains and cold dry seasons

Agro-ecological zone	Short rains		Hot dry		Long rains		Cold dry	
	DMI (kg)	DMP (g/d)	DMI (kg)	DMP (g/d)	DMI (kg)	DMP (g/d)	DMI (kg)	DMP (g/d)
Females (>2years)								
Lower highland 1	7.6±0.21	156.6±4.35	6.1±0.17	127.0±3.48	6.5±0.19	133.8±3.84	6.4±0.18	132.5±3.74
Lower highland 2	8.0±0.50	166.2±10.40	6.8±0.40	141.2±8.34	6.8±0.43	140.3±8.81	7.4±0.42	153.2±8.78
Upper midlands	6.3±0.39	129.5±8.14	5.4±0.29	111.7±5.93	6.3±0.41	129.9±8.58	6.8±0.42	138.8±8.77
Males (>2years)								
Lower highland 1	6.1±0.64	126.1±13.23	4.9±0.41	100.9±8.57	5.4±0.34	112.4±7.08	5.5±0.33	113.3±6.79
Lower highland 2	7.5±0.68	155.5±14.13	6.0±0.30	124.0±6.14	6.8±0.43	140.3±8.97	6.9±0.44	143.2±9.04
Upper midlands	5.8±0.29	120.4±6.05	4.8±0.30	99.3±6.13	6.1±0.33	127.2±6.80	6.0±0.31	124.7±6.52
Heifers (1-2years)								
Lower highland 1	4.2±0.13	86.8±2.72	3.6±0.11	75.5±2.32	3.6±0.13	75.1±2.69	3.7±0.12	77.1±2.59
Lower highland 2	4.1±0.37	84.6±7.69	3.6±0.25	73.7±5.15	3.5±0.17	73.3±3.62	3.6±0.18	74.1±3.69
Upper midlands	3.5±0.29	71.9±6.09	3.1±0.31	64.6±6.38	4.2±0.34	87.3±7.04	3.9±0.27	81.6±5.68
Young males (1-2years)								
Lower highland 1	4.5±0.21	93.1±4.33	4.5±0.19	93.5±3.91	4.4±0.19	91.2±4.00	3.9±0.14	79.9±2.92
Lower highland 2	4.6±0.56	94.6±11.54	4.5±0.35	92.8±7.27	4.5±0.23	92.8±4.67	4.8±0.29	98.3±5.96
Upper midlands	-	-	3.8±0.62	78.4±12.74	4.8±0.49	96.0±10.15	4.7±0.47	96.8±9.77
Calves (<1year)								
Lower highland 1	2.5±0.09	52.3±1.92	4.5±0.15	93.7±3.11	4.5±0.15	92.5±3.09	4.1±0.15	84.1±3.09
Lower highland 2	2.6±0.22	54.0±4.60	4.4±0.26	91.0±5.34	4.1±0.28	85.5±5.89	4.0±0.30	81.8±6.25
Upper midlands	2.3±0.18	47.3±3.84	4.4±0.40	90.7±8.56	3.9±0.36	78.1±7.89	4.5±0.48	92.4±9.90