

Table S1: Physical and chemical soil properties under the five and ten years of grazing exclosures and open grazing lands (n = 405) in Tselemti district of Tigray region, northern Ethiopia, with statistical results of GLM (F, P values)

	Land management practices (GMP)			Soil depth (SD)			GMP		SD		GMP*SD	
	Open grazing land	Five years exclosure	Ten years exclosure	0 -10 cm	10 - 20 cm	20-30 cm	F(df = 2, 26)	P	F(df = 2, 26)	P	F(df = 4, 26)	P
Clay	25.22±2.48 ^a	24.89±0.82 ^a	30.33±3.32 ^a	26.22±2.55 ^a	27.89±2.81 ^a	26.33±2.36 ^a	1.21	0.321	0.11	0.8938	0.09	0.98
Sand	49.11±3.16 ^a	41.33±2.13 ^a	41.33±2.54 ^a	43.78±2.29 ^a	43.11±2.58 ^a	44.89±3.19 ^a	2.37	0.122	0.09	0.91	0.39	0.81
Silt	25.67±1.16 ^b	33.78±1.49 ^a	28.33±2.03 ^b	30.00±2.29 ^a	29.00±1.83 ^a	28.78±1.81 ^a	5.86	0.011	0.15	0.8658	0.68	0.61
BD	1.40±0.034 ^a	1.24±0.031 ^b	1.18±0.052 ^b	1.17±0.05 ^c	1.27±0.043 ^b	1.38±0.036 ^a	15.49	0.0001	12.86	0.0003	0.6	0.67
OC	0.97±0.06 ^b	1.15±0.07 ^b	1.46±0.12 ^a	1.43±122 ^a	1.17±0.079 ^b	0.98±0.65 ^c	16.09	0.0001	13.68	0.0002	1.19	0.35
OM	1.68±0.10 ^b	1.98±0.13 ^b	2.51±0.21 ^a	2.47±0.21 ^a	2.01±0.14 ^b	1.69±0.11 ^c	16.07	0.0001	13.67	0.0002	1.19	0.35
TN	0.06±0.02 ^c	0.10±0.01 ^b	0.15±0.03 ^a	0.12±0.023 ^a	0.10±0.025 ^a	0.09±0.015 ^a	11.59	0.0006	1.95	0.1715	0.07	0.99
pH	6.89±0.11 ^a	6.98±0.17 ^a	6.84±0.04 ^a	6.84±0.09 ^a	6.92±0.04 ^a	6.96±0.18 ^a	1.31	0.295	0.89	0.4284	0.48	0.75
EC	0.26±0.01 ^a	0.26±0.04 ^a	0.24±0.03 ^a	0.22±0.015 ^b	0.25±0.015 ^{ab}	0.28±0.044 ^a	0.54	0.592	2.53	0.1078	0.12	0.97
AP	3.03±0.23 ^c	3.56±0.35 ^b	4.68±0.44 ^a	4.69±0.38 ^a	3.78±0.36 ^b	2.7±0.15 ^c	25.77	0.0001	35.52	0.0001	3.61	0.03
Ca	11.89±1.23 ^b	13.11±0.22 ^a	13.78±0.42 ^a	11.78±0.64 ^b	12.09±0.75 ^b	14.22±0.77 ^a	6.97	0.006	11.47	0.0006	1.02	0.43
Mg	4.33±0.33 ^b	5.22±0.55 ^a	5.89±0.35 ^a	4.11±0.44 ^b	5.56±0.34 ^a	5.78±0.33 ^a	7.79	0.004	10.47	0.001	0.37	0.83
K	0.38±0.038 ^c	0.48±0.031 ^b	0.55±0.024 ^a	0.52±0.023 ^a	0.48±0.021 ^a	0.41±0.026 ^b	23.03	0.0001	12.13	0.0005	0.12	0.98
Na	0.29±0.031 ^b	0.31±0.043 ^b	0.41±0.042 ^a	0.44±0.032 ^a	0.32±0.04 ^b	0.26±0.029 ^b	4.44	0.027	8.88	0.0021	0.21	0.93
CEC	38.11±2.8 ^b	41.29±0.83 ^a	41.53±0.96 ^a	38.24±2.13 ^b	40.40±2.25 ^a	42.29±2.39 ^a	7.08	0.005	7.96	0.0033	0.24	0.91

Means with similar superscripts between rows across soil depth and grazing land management practices are not significantly different at P≤0.05.

Clay = clay in %; Sand = sand in %; Silt = silt in %; BD = bulk density (g/cm³); OC = organic carbon (%); OM = organic matter (%); TN = total nitrogen (%); pH= power of hydrogen ion (1:2.5); EC = electrical conductivity (mmhos/Cm); AP = available phosphorus (ppm); Ca = calcium (Cmol (+) /kg); Mg = magnesium (Cmol (+) /kg); K = potassium (Cmol (+) /kg); Na = sodium (Cmol (+) /kg); CEC = cation exchange capacity (meq/100g of soil)