

Partial C and N balances of small-scale farms in a river oasis of Western Mongolian

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Introduction & Objectives

- Mongolia's national policy fosters the expansion and intensification of crop and forage production.
- Non-sustainable agricultural management practices may lead to disequilibria in soil surface balances of agricultural plots jeopardizing the scarce and susceptible agro-ecological resources of river oases.

The objectives of this study were:

- ➔ to calculate partial carbon (C) and nitrogen (N) balances,
- ➔ to identify measures to correct possible imbalances.

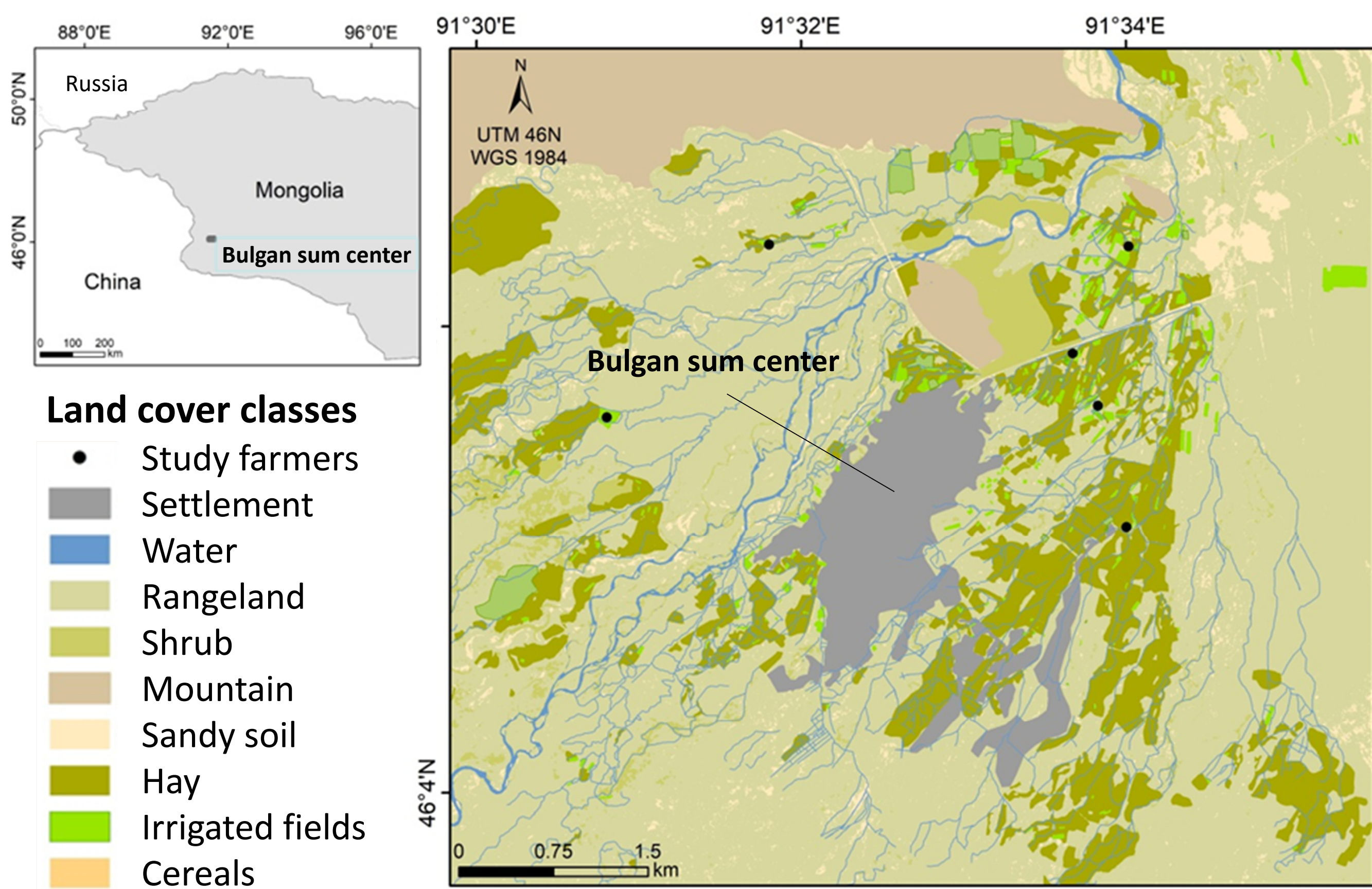
Conclusions

The observed negative C and N balances requires:

- ➔ Increase of N input through alfalfa (*Medicago sativa* L.) cultivation,
- ➔ Increase of C and N input through increased use of organic fertilizer provided by agro-pastoralists' livestock,
- ➔ Incorporation of fertilizers into soil to minimize gaseous emission.

Materials & Methods

- Quantification of major input and output fluxes for C and N.
- Calculation of partial soil surface balances for C and N.
- Where: Carrot (*Daucus carota* subsp. *Sativus* (Hoffm.) Schübl. & G. Martens), hay and rye (*Secale cereal* L.) plots in 6 study farms of agro-pastoralists in the river oasis Bulgan sum center.
- When: Growing seasons 2013 and 2014.



Results

Carbon	Inputs					Outputs			Inputs - Outputs
	Fertilizer	Irrigation	C-fixation	Deposition	Total	Biomass	Emission	Total	Total
	kg C ha ⁻¹ season ⁻¹					kg C ha ⁻¹ season ⁻¹			kg C ha ⁻¹ season ⁻¹
Carrot	569	52	3597	5	4223	1799	3506	5305	-1082
Hay	569	12	4642	5	5229	2321	4514	6835	-1606
Rye	569	38	3676	5	4289	1838	3861	5699	-1410

Nitrogen	Inputs					Outputs			Inputs - Outputs
	Fertilizer	Irrigation	N ₂ -fixation	Deposition	Seeds	Total	Biomass	Emission	Total
	kg N ha ⁻¹ season ⁻¹					kg N ha ⁻¹ season ⁻¹			kg N ha ⁻¹ season ⁻¹
Carrot	22.3	2.1	0.0	9.4	4.2	38.0	92.1	10.9	103.0
Hay	22.3	0.5	32.2	9.4	4.2	68.6	86.0	9.5	95.6
Rye	22.3	1.3	0.0	9.4	4.2	37.2	69.2	7.4	76.5

Potentials



Alfalfa: up to 560 kg C ha⁻¹ a⁻¹, up to 45 kg N ha⁻¹ a⁻¹



Manure: up to 1801 kg C ha⁻¹ a⁻¹, up to 77 kg N ha⁻¹ a⁻¹

