

Introduction and Objectives

The importance of the small-scaled agricultural fields of Bulgan Sum, Mongolia, raised strongly after the Dzud disaster in 2009. Little is known about the management practices of these fields. The main objectives of the study in 2013 were:

- The measurement of input and output fluxes of carbon and nutrients of these fields.
- The determination of chemical soil properties used for agriculture in Bulgan Sum, Mongolia.

Materials and Methods

The study area is located in a typical hot semi-desert climate with harsh winters and short crop growing seasons. Between May and October of the study year 2013, the average monthly rainfall was 2.6 mm with a relative humidity of 42.1% and an average air temperature of 17.3°C (IMHE, 2013).

Based on the baseline survey from 2012 and farmers' willingness to cooperate, six homegardens were selected for in-depth studies (Figure 1).

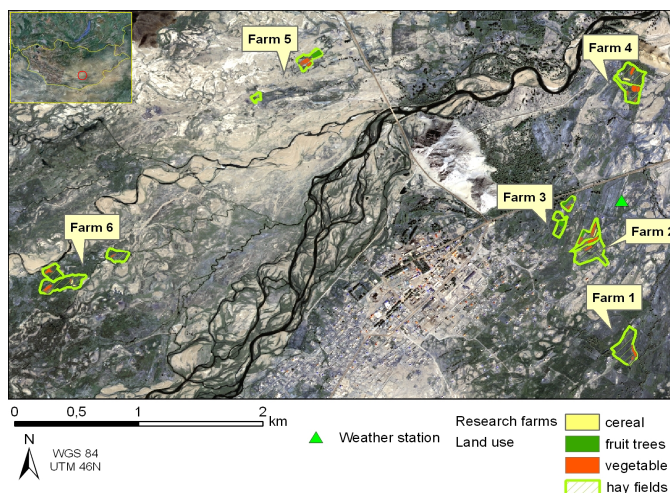


Figure 1. Location of the selected farms

Total area of the selected farms ranged from 2.1 ha to 6.5 ha and were planted with 8 to 11 crop species (Fig. 2). Horizontal and vertical carbon and nutrient fluxes were measured on the plots located in carrot, rye and hay fields chosen due to yield and income per 1 m² plot.

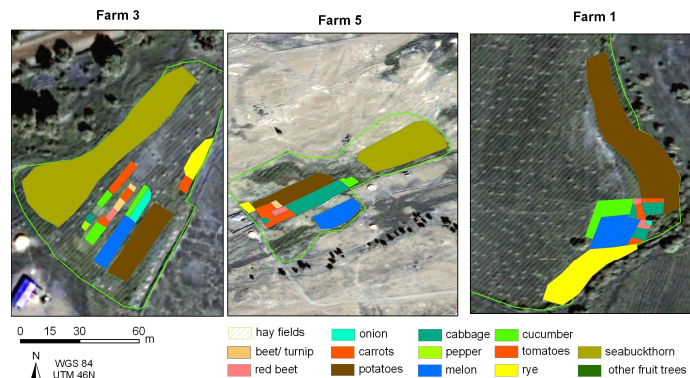


Figure 2. Some examples of typical farm structures in Bulgan.

Samples of soil, manure, rain and irrigation water, dust deposition and crop yield were collected. Soil samples have been analyzed for pH, electrical conductivity, organic matter and plant available phosphorous.

Results and Conclusions

- All agricultural fields used river water for irrigation. Flooding the fields was the typical type of irrigation.
- Hay management system used 52 kg ha⁻¹ of animal manure while no manure application occurred in the rye and carrot system.
- Average yield was 2 t ha⁻¹ for carrot, 0.02 t ha⁻¹ for rye and 4.06 t ha⁻¹ for hay.
- Organic matter in the soil ranged from 0.39 to 0.72% and plant available phosphorous was the highest in carrot production system (Table 1).

Table 1. Soil chemical properties in the six farms in Bulgan, Mongolia, during 2013.

Soil chemical properties	Rye	Carrot	Hay
pH (H ₂ O)	7.82	7.30	7.53
Electrical Conductivity (dS/m)	0.10	0.08	0.06
Organic matter (%)	0.72	0.39	0.40
Phosphorus (mg kg ⁻¹)	0.27	0.37	0.33

High demand for the hay as a feed for the livestock especially in winter would be the reason why hay field occupied the most area (66.7-92.1%) of total farm area.

The usage of manure in the agricultural production system may be explained by the strong linkage of farming practices to livestock.

