SPATIAL DISTRIBUTION OF CRUDE PROTEIN (CP), CRUDE FIBRE (CF) IN FORAGE SAMPLES OF MONGOLIAN PASTURELAND

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Abstract: Resent years study shows that growing number of livestock, global warming, desertification process and human influence all caused deterioration and degradation of Mongolian pasturelands. The research works on chemical composition for selected plant species have been conducted but years have passed since. Forage samples collected from 1026 monitoring points of National Agency Metrology Hydrology and Environmental Monitoring were analyzed chemically on crude protein, crude fiber parameters and by NIRS spectra. Map illustrating spatial distribution of crude protein (CP), crude fibre (CF) in forage samples of Mongolian pastureland were developed. Calibration equations were developed using partial least squares regression.

INTRODUCTION

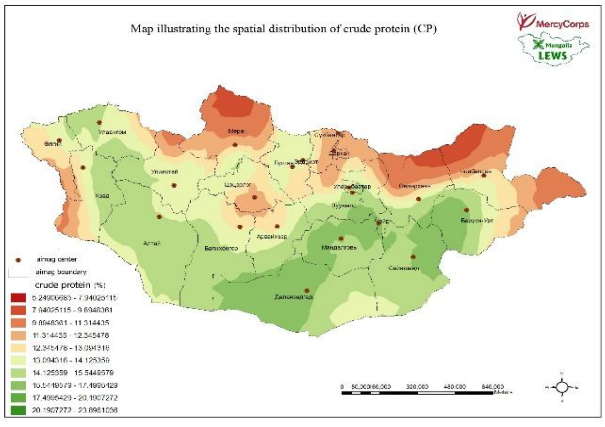
In the period from 1999 to 2002, Mongolia experienced a series of droughts and severe winters that lowered livestock numbers by approximately 30% countrywide. In the Gobi region, livestock mortality reached 50% with many households losing entire herds (Siurua& Swift 2002). In March 2004, a LEWS project was initiated by the USAID through the Global Livestock Collaborative Research and Support Program (GLCRSP) to provide early warning of drought and winter disasters. The program has to develop a communication infrastructure to provide herders with forage condition information to assist in making timely and specific management decision.

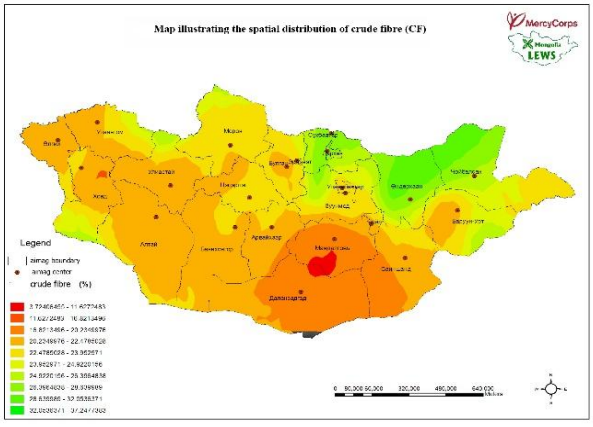
MATERIALS AND METHODS

Forage samples collected from 1026 monitoring points of NAMHEM were transferred to "Feed Evaluation Laboratory" of Research Institute of Animal Husbandry and crude protein, crude fiber constraints of them analyzed chemically. GPS, GIS technology used to develope Nutritive Value Map illustrating the spatial distribution of crude protein (CP), crude fibre (CP) on Mongolian pastureland.
Near infrared spectra (800 to 1700 nm) were obtained on the 1026 forage samples with an Ocean Optics® NIRS 512 portable spectrometer. Calibration equations were developed using partial least squares regression. The reference method error for CP in this study was 0.49

RESULTS

The results on spatial distribution of crude protein and crude fibre in the pastureland of Mongolia shown in the





following figures.

Figure 1. Crude protein content distribution in Mongolian pastureland

Figure 2. Crude fiber content in Mongolian pastureland

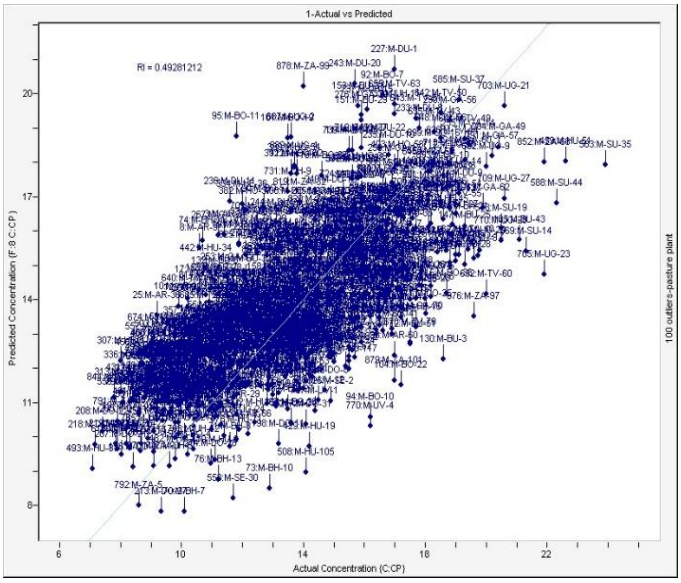


Figure 3. Actual vs Predicted Results of pasture grasses

The nutritive value maps illustrating the spatial distribution of crude protein (CP), crude fibre (CF) of the pastureland were developed. The development of one general equation standard for all samples collected from NAMHEM monitoring was completed.Calibration results for portable NIRS predicted forage CP (Figure 3) were: RSQ = 0.49, SEC = 2.14

DISCUSSION

This paper contains only the results of one study and represent the first use of portable NIRS technology for this purpose. Further refinement of the technique continues.

CONCLUSIONS

Crude protein /CP/ and crude fiber /CF/ in forage samples collected from Mongolian pastureland can be determined from forage samples with a portable NIRS instrument without expensive chemical analyzes, however, further work is needed before this technique can be used in practical application.

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