

Livestock mapping in Mongolia using satellite and statistical data

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Abstract: Livestock production makes an important contribution to most economies. The contribution of livestock data to the calculation of poverty indicators or in identifying livelihood strategies, which is primary in remote areas of developing countries, such as Mongolia is significant. Assessing livestock production and its requirements in relation to other possibly competing natural resource sectors (wildlife, forestry) is becoming necessary.

This study carried out an investigation to determine the relationship between number of livestock and vegetation derived NOAA satellite data. The research tries to identify what data are needed for livestock mapping in grassland area. Output livestock mapping can be used to contribute to sustainable management of grasslands in Mongolia and improve animal production and feeding with locally available feed resources.

Key words: *pasture land, livestock, vegetation index, and socio-economic data*

1. Introduction

Grasslands are one of the main natural resources used for livestock. The extended grasslands of Mongolia have been used for five kinds of animals: camels, horses, cattle, sheep and goats. Mongolian livestock breeding have been based on the use of natural pasture throughout the year, as 80% of the total territory is used for pastures(Figure 1).

Environmental degradation and desertification from human pressure and land use has become a major problem. Changes in the spatial distribution and size of the livestock population effects on the other sectors of agriculture.

The state of the resource base of the Mongolian rural area should be examined in relation to population pressure by integrating vegetation growth. It is essential to understand nomadic animal husbandry with the information related to environmental and socio-economic variables.

The objective of this paper is to examine the relationship between number of livestock and vegetation growth derived from NOAA satellite data of four different natural zones.

2. Study area and data

The study area is Mongolia, is located in the central part of Asia continent:

N40° 35' -52° 09' and E87° 44' -119° 56' Total area: 1.56 million square km. Climate: short-dry summer and long-cold winter season. Growing season: from May to September.

In general, Mongolia can be divided into main 4 natural zones: high mountain, forest, steppe, and desert-steppe. This research will examine the following 4 provinces from each natural zone: Bayan-Ulgii, Dornod, Tuv and Dundgovi. NOAA AHVRR NDVI data 8 km, 1995-2000 and statistical data from years 1995-2001 were carried for this research (Figure 2).

3. Methodology and analyses

Livestock populations are not static. Livestock distributions change with the seasons, droughts

$$\Delta L = F(V + \Delta V, S, P, M) - L(V, S, P, M)$$

and with vegetation growth In this study the relationship between numbers of livestock and NDVI was analysed using DUMMY VARIEBLIES method. Partial increments of vegetation and change where L is numbers and densities of livestock ,V is vegetation index, S seasonal change, P is productivity parameters and intensification levels and M is movement of livestock husbandry.

We examined the relationships between livestock number and vegetation growth over 1995-2001 (Figure 3).

4. Conclusions

According to the monthly NDVI composite images, we can determine the temporal and spatial changes of vegetation growth. We calculated normal values using monthly composite NDVI of July for each region and all natural zones have different NDVI value, especially in growing season. We can describe that there have other factors, such as economic interest from the statistical data and need to examine and integrate other social-economic data.



Figure 1. Livestock in the study area by 2001 year

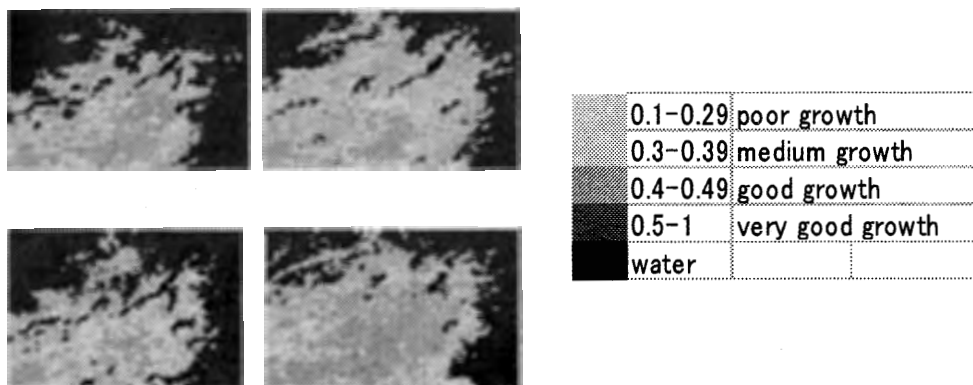


Figure 2. Vegetation growth in selected 4 areas of Mongolia in 1995-2001

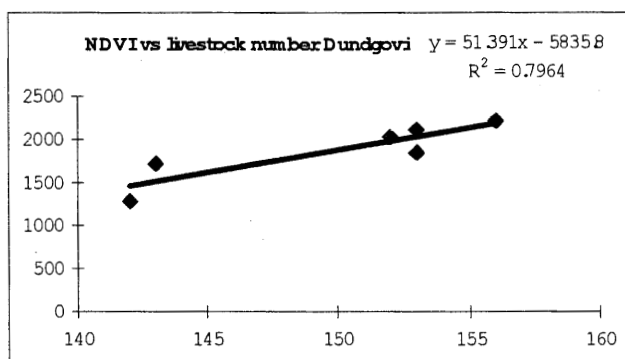


Figure 3. Relationship between NDVI and livestock in 1995-2001

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