GRASSLAND TYPE AND OVER GRAZED AREA ESTIMATION USING REMOTE SENSING AND GROUND DATA IN MONGOLIA.

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ABSTRACT:

The Unvsnuur Hollow is located in westing part of Mongolia and occupies some 30.000 sq.km area with specific features covering all the Natural zones of the wold such as desert Gobi, step, forest steppe, lake, glacier and taiga where all biosphere's processes can be reflected. The climate and plants are appearing vertically different distribution. The problem of ecological balance of the Uvsnuur hollow should be considered not only within the region but in relation to the biospere's qlobal Change. Therefore, we have selected the study area in Uvsnuur hollow for this investigation. We have investigated the grassland type and over grazed area using Landsat TM and ground survey data.

Keywords: Remote sensing, feature extraction, landsat data, image processing, renewable resources.

1. Introduction

Pasture vegetation resources of the most part of the territory of the Mongolia have Gobi desert pasture, steppe pasture, meadow pasture. Various pastures can be used to graze of the animals, and some of them can be used cut grass for the fodder. Besides, some one can also be used to collect medicinal plants. There are existing problems in development and utilization of pastures. For example the productivity of most pastures are low, pastures have been over grazed universally, more pastures have deteriorated seriously.

To utilize pasture vegetation resources particularly, in Gobi desert and steppe region of the Mongolia, it is necessary to utilize rationally protect and improve them. Mongolia has many heads of the animals. Therefore, the studies of the impact of the animal population growth on the grassland is important scientific task for estimation of the ecological condition of the grassland and its change for the territory of the Mongolia.

The studies the grassland type and it's resources are very important. For this purpose we have tried to investigate the grassland type and influences of the human activities and animals to the grassland type and it's environment using the satellite and ground data.

2. The study area

This is includes the western part of the Landsat TM scene covering Uvs Nuur hollow which located in the western part of the Mongolia. This area with more that 225 square km. The climate and grassland are appearing vertically different distribution.

3. The methodology and data

Some approaches by computer and ground data were undertook as follows:
1.Selecting the best way for colour composition of the different bands for the feature extraction.
2.Selecting the most suitable scale of image enlargement.
3.Selecting the best classification schemes.
4.Combining image processing with image interpretation.

There were used the remote sensing data and field parasynchronic survey. Data from Landsat satellite was received in the middle of the July, 1992. The field survey for estimation the grassland type and over grazed area have been carried out in the two week after receiving the satellite data. Also were used the topographic maps with scale 1:100 000 and 1:200 000. For estimation of the changes of the grassland type and over grazed area we used grassland map which was compiled in 1978 using the ground survey data.

4. Results

The results of the investigations which made in 1978, show that the study area can divided into 2 parts.(Figure 1).
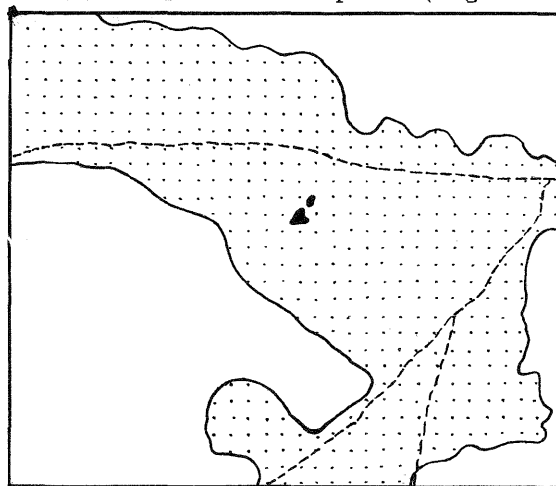

Figure 1.

[: : :] - Steppe grassland.

[   ] - Mountains grassland.

[♠] - Lake

There are plaint steppe grassland takes percentage of 46.61%, mountainous grassland is 53.39% percent. In mountains area, there are brown soil which related to mountains dry steppe. The main content of grassland were Festuca lenensis, Buplerum multinerve, Leontopodium leontopoides.

The average grassland productivity of the above mentioned area was 2.0 Cent.per hectare.

In the plaint area, there are soft brown soil which related to steppe. The main contents of the grassland were Stipa krylovii, Poa atthenuata, Koeleria gracilas, Aster altaica, Buplerum vicaule, Artemisia frigida.

The average productivity of the grassland of the plaint area was 3.0 Cent.per hectare.

According to the classification standard of grassland and its realistic condition, grassland of the study area was classified into 3 districts, 6 associations, 14 types. There was industry not considerable. There were 3 kind of roads by cars and heavy tractors for agricultural activities of the local administration.

The results of the investigations which made in 1991, show that grassland type of study area were changed by human activities and animals.(Figure 2). Almost of the parts of the study area became the
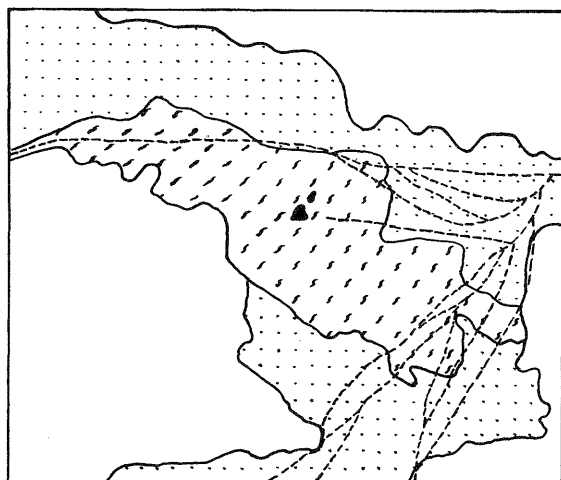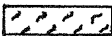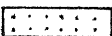

Figure 2.

⟋⟋⟋⟋ - Over grazed area.

[: : : : :] - Moderity grazed area.

[   ] - None grazed area.

⬥ - Lake

over grazed by animals. It is caused by excessive human activities and unfavorable climatic condition-serious drought and frequent winds.

This study area can divided into 3 parts, for example severe over grazed area, moderity over grazed area and none grazed area. There are severe over grazed area takes percentage of 21.1%, moderity over grazed area is 37.06%, none grazed area is 41.7% respectivity. There are the main contents of the grassland are

changed, average productivity is reduced on the 50 - 70% compared with productivity of grassland which determined in 1978.

Also there are appearing the new type of grassland such as Artemisia glanca, Artemisia frigida, Artemisia adamsi, Potenttilla biburca, Potentilla acaules, Plantago major, Chenopodium glansum.

Though industrial utilization of this territory is not considerable, the increasing number of cars and heavy tractors used in agriculture and contraction leads to substantial violation of surroundings. Therefore, many roads of the car and heavy tractor which are going through study research area after 1978 and has been destroyed the soil and vegetation cover.

It is analyzed that the quickly extension of the over grazed area is caused by following mistakes:

a) Uncontrolled growth of populations-animal and human. This process brings great pressure lands and and vegetation and blowout the fertile part of the surface it is referred to as an impact to develop desertification.

b) The absent of the asphalt roads driving to appear many ground roads which, destroyed much of land and vegetation cover.

c) Severe drought and frequent winds are the physical factors to produce risks on lands and vegetation cover.

The appearance of above factors in the study area brings a serious threat to agricultural practice and animal husbandry.

Furthermore, positive measures should be adopted to renew the degraded environment in the over grazed areas. The improvement of environmental quality and the increase of animal population carrying capacity of land are also the positive ways to fill to gaps amongst the animal population,resource and environment.

It is suggested that the over grazed area can be rehabilitated as following steps. a) To reject and fence the degradated areas for increasing the percentage of plantation and rotation grazing.

b) To establish shelterbelts for predicting farmlands and grasslands opposite the moving the fertile parts of surface.

c) To extend reverse and reserve systems on over grazing land.

d) To encourage artificial plantation of sand-fixing species on the broken surface.

Conclusion.

Animal population, renewable natural resources such as grassland, forest and environment are interdependent and interacted. This relationship can be seen in the semi-arid zone in western part of the Mongolia where the ecological condition is limited. The important and effective method for the estimation of the grassland type and over grazed area is remote sensing technology with ground data.

Animal and human population growth causes:

a) Decrease of average productivity of the grassland for each animal due to the grazing of the vegetation and abandonment of infertile farm.

b) Blindly increase of human activities (appear the roads and wells) and over-loading of rangelands and its vegetation cover.

c) Insufficiency of energy fuel.

d) Uncontrolled cutting of herd plant. It is considered that the policy on pasture utilization planning is one of the fundamental strategies and suitable to the national situation in Mongolia and it should be carried out continuously.