

THE CHANGE OF LANDSCAPE PATTERN IN ARID MOUNTAIN OF THE UPPER REACHES OF SHULE RIVER BASIN IN NORTHWEST CHINA

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Changes in land use and land cover are among the most important socio-economic forces of global as well as local environmental change. Mountain is a source of water in the arid regions, playing an important role in keeping ecological balance. The change of landscape pattern there will change the pattern of water resource in the inland river, resulting in different hydr-ecological effect. Research into landscape changes is a basic work of understanding the trend of ecological function adjusting the ecological health of the middle and lower reaches of a inland river basin. The upper reaches of Shule River Basin located in the western of Qilian Mountain sited in arid Northwest China. The study areas covers $1.1 \times 10^4 \text{km}^2$, and the elevation is above 2100m. The main human activity is grazing in the study areas.

In this paper, based on the Landsat TM remote sensing satellite date of the study areas taken in July 1986, July 2000, and DEM (1:50000), using ArcGIS software, we calculated and analyzed the landscape changes in the different elevation zones of the study regions. The results show that: (1) Area of the lower coverage grassland is the largest in all the landscape types, and the second is bare rock, the third is freezing-thawing rock above the elevation 4100m, and the fourth is middle coverage grassland, respectively accounting for 26%, 23%, 20% and 19% of the study areas. The higher coverage grassland accounted for only 4.5%. (2) During the 15 years, the change of the higher grassland is the largest, which decreased 299.45km^2 . The second is middle coverage grassland with decreasing 91.5km^2 . On the other hand, the area of the swamp meadow increased the largest with 168.92km^2 , and the freezing-throwing rock increased 101.28km^2 , the lower coverage grassland increased 95.3km^2 . (3) Combing

to the DEM, we calculated the landscape transform matrix. The result indicated that 14% of the area of higher coverage grassland transformed to swamp meadow at the elevation zone 4000m-4200m, and 6.16% at the elevation zone 3800m-4000m, and 13% transformed to lower coverage grassland at the elevation zone 3800m-4200m, 9.2% transformed to middle coverage grassland at the elevation zone 3800m-4000m. (4) The reason of the middle coverage grassland decreasing is that the transform to higher grassland at the elevation zone 3800m-4000m, and the transform to lower coverage grassland and barren land at the elevation areas below 3500m. All of these results showed that the landscape change above 3800m elevation was mainly forced by natural factor, for example the increasing precipitation and temperature, and the landscape change below 3800m was mainly forced by human activity factor for the instance of over grazing.

Key words: Landscape Change; Shule river basin; GIS; Northwest China, driving factor