

Analysis of Two Representative Land Use Changes in the Manas River Basin (Postprint)

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Date: 2018-06-28T00:00:00+00:00

Abstract

Comparative analysis of differences in typical land use changes under the two land management patterns of the Xinjiang Production and Construction Corps and local areas is of great significance for understanding how different modes of human activity influence land use. Taking the Corps and local areas in the Manas River Basin, Xinjiang as the study object, and utilizing Landsat MSS/TM/OLI and CBERS-02B remote sensing imagery data from 1972 to 2015, this study comprehensively analyzed typical land use changes. The results indicate: (1) Differences in land use changes between the Corps and local areas are mainly manifested in cropland and construction land, with cropland changes being more pronounced in the Corps, while construction land changes are more pronounced in local areas. (2) Unlike the small-scale autonomous management model in local areas, which features limited parcel sizes and high fragmentation, the Corps implements a large-scale unified land management model characterized by high-frequency land consolidation, continuous parcel concentration, and increasingly simplified landscape patterns. (3) The primary reason for the significant differences in the degree of land use change and landscape patterns between the Corps and local areas lies in their distinct land management models.

Full Text

Abstract

Xinjiang has two basic land management modes: the “farm management mode” developed by the Xinjiang Production and Construction Corps and the “local mode” formed by local governments. Comparative analysis of the differences between these two typical land use change patterns is of great significance for understanding the impact of different human activities on land use. This paper takes the Manas River Basin in Xinjiang as the research area, with the Corps and

local areas as research objects, using a constructed land use dataset of the Manas River Basin. We investigated the differences between farm management mode and local mode on land use change patterns and landscape patterns using land use indices and landscape pattern indices. The results are as follows: (1) The land-use processes show some differences between the two modes. The difference in land use change between the Corps and local areas is mainly reflected in cultivated and construction land types. The change of arable land in the Corps is more significant, while the change of local construction land is more significant. (2) The Corps differs from the local area in that it carries out large-scale unified management of land use mode, with higher land consolidation frequency, land constantly concentrated, and landscape pattern tending to be simple. The local mode carries out small-scale independent operation, the scale of land block is limited, and the degree of breakage is high. (3) Compared with the local communities, there are significant differences in land use change degree and landscape pattern. The difference is mainly due to the difference between the Corps and the local land management mode. The comparative analysis of the differences in land use change between the Corps and the local government plays an important role in the rational use of land and the sustainable development of the region.

Keywords: land use model; management model; comparative analysis; landscape pattern; Manas River Basin

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Figure 6. Quantitative description of landscape pattern of mainland use type index during 1970s-2015

Table 7. The comparisons of mainland use type during 1970s-2015

Note: Figure translations are in progress. See original paper for figures.

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