Study on Changes of Land Cover in the Typical Arid Region of the Loess Plateau after the Grain for Green Project

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Huining county is located in the southern of Loess Plateau in China. As a very typical arid/semi-arid area in hilly and gully regions of the Loess Plateau, it seems to be a very significant test area for evaluation of Grain for Green Project. In this paper, MODIS NDVI was selected as the data source to track the variation of vegetation coverage in Huining from 2000 to 2010 and vegetation coverage maps from different periods using the two sub-pixel model.

Vegetation coverage, which is defined as the projected area of aboveground vegetation part per unit ground area, is an important ecological parameter [1]. In this study, results show that the vegetation coverage exhibits higher in the northern region, but lower in the central and southern regions in Huining county. Since the policy of Grain for Green Project was put into force, the vegetation coverage in the county has increased and maintains above 20% in most years whereas it has reached to peak value of 36.60% in 2005. During 11 monitoring years, the land is dominated by low and medium-low vegetation coverage type with a large spatial variation. The increased areas of the vegetation coverage are about 70.60%, where the transformation of vegetation coverage is mainly focused on the range from 10% to 45%. Both human activities and climate changes are the main factors to induce the changes of vegetation coverage. Meanwhile, there shows a significant correlation (R^2 = 0.688) between precipitation and vegetation coverage.

As typical arid/semi-arid hilly and gully areas, the ecological recovery will be affected by scarce of water resources [2]. It is important to monitor the ecological recovery trends and assess the validity of Grain for Green Project practicing facing the challenge of increasing human intervention and global climate change in future. A study suggested that the vegetation coverage on the Loess Plateau has been greatly increased by China's Grain for Green project since 1999, and the vegetation should be maintained but not expanded further as planned [3].

[1] Mu Shaojie, et al. (2013)Journal of Geographical Sciences, 23(2): 231-246. [2] Fu BJ, et al. (2000)Journal of Arid Environments, 44(3):291-303. [3] Chen Yiping, et al. (2015)Nature Geoscience, 10(8): 739-741.