

Spatio-temporal variation of water conservation and its impact factors on the southern slope of Qilian Mountains

ABSTRACT

The ecology of the Qilian Mountains has been seriously threatened by uncontrolled grazing and wasteland reclamation. This study examined the ecological changes on the southern slope of Qilian Mountains from the perspective of water conservation by classifying different clusters of water conservation functional areas to efficiently use limited human resources to tackle the water conservation protection problem. In this study, we used Integrate Valuation of Ecosystem Services and Tradeoffs (InVEST) model to estimate water conservation and analyzed the factors that influence the function. The results of this study include: (1) from 2000 to 2015, the water conservation of the southern slope of Qilian Mountains generally showed an increasing trend, and the total water conservation in 2015 increased by 42.18% compared with 2000. (2) Rainfall, fractional vegetation cover (FVC), and evapotranspiration have the most significant influence on the water conservation of study area. Among them, water conservation is positively correlated with rainfall and FVC ($P < 0.05$) and negatively correlated with evapotranspiration ($P < 0.05$). (3) The importance level of water conservation functional areas gradually increases from northwest to southeast, and the region surrounding Menyuan Hui Autonomous County in the southeast of the southern slope of Qilian Mountains is the core water conservation functional area. (4) The study area was divided into five clusters of water conservation, with the areas of Clusters I through V accounting for 0.58%, 13.74%, 41.23%, 32.43%, and 12.01% of the whole study area, respectively.