

THE EFFECT OF LAND USE CHANGES ON SOIL CONDITIONS IN ARID REGION

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ABSTRACT: Land use change may influence a variety of natural and ecological processes, including soil nutrient, soil moisture, soil erosion, land productivity and biodiversity. In this paper, 9 typical land use patterns sustainable 15 – 20 years have been chosen to study the effect of different land use patterns on soil nutrient, soil erosion, soil moisture, saline and so on. We drew conclusions as follows: Firstly, it is clear of the effect of land use change on soil. Land use change results in the decline of soil nutrient and erosion rate, but the increase of land productivity; secondly, the erosion rate and the rate of vegetation cover is the subtractive correlativity. It reflects the effect of soil erosion on land productivity. It is clear of the positive correlativity between land productivity and soil moisture and explains the role of land surface vegetation to preventing aridity in the northwestern China; lastly, it is feasible to develop animal husbandry properly in arid region. The topgallant land use pattern is the combination of forest and meadow in arid region. The rational land use may prevent or weaken the intensity of soil erosion in a certain extent. Therefore, activities accorded with ecological principal such as readjustment of land use structure, rational reclamation along with adoption of prevention and control measures can reverse land degradation process.

KEY WORDS: land use change; soil nutrient; soil moisture; soil erosion; land productivity; Korla City

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1 INTRODUCTION

Land use change may influence a variety of natural and ecological processes, including soil nutrient, soil moisture, soil erosion, land productivity (FU *et al.* , 1999), biodiversity, cycle of biographical geochemistry, and so on (VITOUSEK, 1994). So, it is very important that the studies of land use changes understand regional eco-environment and global environmental change. At present, the studies of land use change fasten on the effect and response to global

change. For instance, climatological change (SKUKLA, 1990), let-off of CH₄ and N₂O (MASTON, 1990), and hydrological change (FUNG, 1991; MOONEY, 1987; RICHEY, 1989; CARPENTER, 1992). But the studies of ecological involvement and physical geographical process in regional scale are relatively lack. Eco-environment is quite fragile in arid region and its response is very sensitive. Wind erosion, water shortage, saline and land degradation menaces seriously agricultural sustainable development in arid region, the irrational land use aggravates the aforementioned processes (FAN ,

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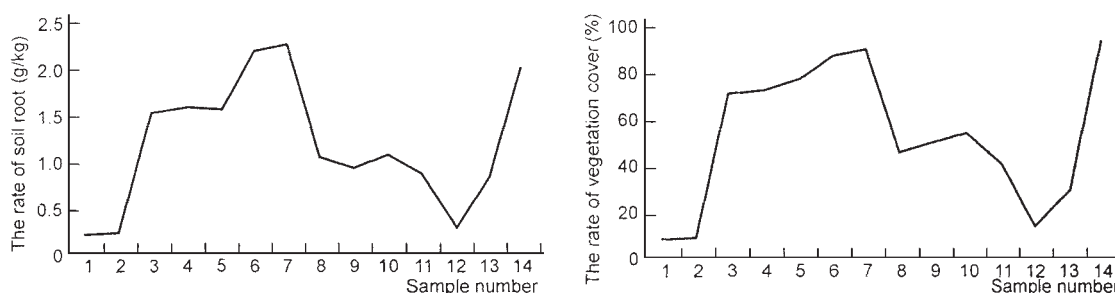


Fig. 4 The change of land productivity in different land use in Korla City

the rate of vegetation cover is the subtractive correlativity. It reflects the effect of soil erosion on land productivity. It is clear of the positive correlativity between land productivity and soil moisture and explains the role of land surface vegetation to preventing aridity in the northwestern China. And (3) It is feasible to develop animal husbandry properly in arid region. The topgallant land use pattern is the combination of forest and meadow in arid region. The rational land use may prevent or weaken the intensity of soil erosion in a certain extent. Therefore, activities accorded with ecological principle such as readjustment of land use structure, rational reclamation along with adoption of prevention and control measures can reverse land degradation process.

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