

研究论文

内陆河流域中、下游绿洲耕地变化及其驱动因素——以石羊河流域中游凉州区和下游民勤绿洲为例

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摘要 以野外实际调查资料以及社会经济统计资料, 结合研究区1986年和2000年的TM影像数据, 分析了石羊河流域中游凉州区和下游民勤绿洲近20a来的耕地变化及其驱动因子, 结果表明: (1) 两个绿洲的耕地面积都呈增加趋势, 且民勤绿洲耕地增加速度更为显著; 在空间上新增耕地主要集中在荒漠和绿洲的交错地带, 耕地的增加凉州区以沙地作为主要来源, 而民勤则以牺牲林草地为代价。(2) 从耕地变化驱动力来看, 人口增加是直接动因, 同时农业科技进步和社会经济的发展为耕地面积的扩大提供了前提条件; 此外, 耕地面积的变化在凉州区与地表水量关系密切; 而在民勤则与大风、沙尘暴天气等生态环境问题以及绿洲内的降水、蒸发等气象因素有显著关系。充分表明石羊河流域中游绿洲经济的繁荣发展以下游民勤绿洲的急剧衰退为代价。

关键词 [绿洲](#); [耕地变化](#); [驱动因子](#); [石羊河流域](#)

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Comparison on changes and their driving forces of farmland in oases of middle and lower reaches: The case of Liangzhou and Minqin oases in the Shiyang river basin

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Abstract The development and utilization of water and land resources in the Shiyang river basin is the highest among the 3 inland rivers in the Hexi Corridor of Gansu province, northwestern China. Based on field investigation and social-economical data, in combination with TM images of the study area in 1986 and 2000, this paper analyzed the changes of farmland and their driving forces in Liangzhouqu and Minqin oases in the middle and lower reaches of Shiyang river basin in the last 20 years.

Farmland increased in both oases, while Minqin oasis increased more quickly. Most of the increased farmland was distributed on desert-oasis ecotones. But it was mainly converted from desert in Liangzhou oasis, and from woodland and grassland in Minqin oasis. In view of driving forces, the population increase was one of the most important factors, and improvement of agricultural technique and economic development provided conditions for farmland expansion in both oases. In addition, the expansion of farmland was closely related to the amount of surface water in Liangzhou oasis, but was effected by ecological environment such as gale and dust storm, and weather conditions such as rainfall and evaporation in Minqin oasis. With the development of human activities and expansion of farmland in Liangzhou oasis, the need for surface water is ever-growing from year to year, resulting in a decrease of annual discharge to the Hongyashan reservoir from $5 \times 10^8 \text{ m}^3$ during the 1950s and 1960s to only $1.0 \times 10^8 \text{ m}^3$ or so at present. Therefore overuse of grou

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ndwater in these regions, especially in the downstream Minqin oasis is very notable. All these indicated that the development of oases in the middle and lower reaches of Shiyang River had already lost the balance to a great extent, and the economic increase of Liangzhouqu oasis is at the cost of environment deterioration of Minqin oasis. In order to realize rational resource utilization and sustainable development of Shiyang river basin, the surface water should be allotted at a reasonable proportion in the whole watershed, recovering the runoff in the lower reaches to 18% of the total runoff (about $2.5 \times 10^8 \text{m}^3/\text{a}$) of Shiyang river, which used to be the level in early 1980s. In addition, the charge for transfer of water from other watersheds should be allocated according to the proportion of runoff utilization, and thus reduce the cost of water use in the lower reaches such as Minqin Oasis.

Key words [oasis](#) [farmland](#) [changes](#) [driving](#) [forces](#) [Shiyang](#) [river](#) [basin](#) [water](#) [resource](#)

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