

研究简报

黄土丘陵区小流域系统生态经济要素分析

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收稿日期 2005-11-22 修回日期 2006-6-24 网络版发布日期: 2006-10-25

摘要 以隆德县李太平小流域为例, 对比分析了退化小流域系统恢复重建过程中系统的生态经济要素变化, 揭示系统演变趋势。应用能值方法分析了投入产出的动态变化, 评价治理的生态经济效果。结果显示: 农、林、牧业用地比例由1990年的6.2: 2.0: 1.0变为2003年的1.9: 1.4: 1.0, 土地利用及种植结构趋于合理, 农业产值所占比重由79.6%下降为54.8%, 林业、牧业、副业产值比例分别由9.6%、9.6%、1.1%上升为22.7%、15.1%、7.4%, 收入多样性指数也呈增加趋势, 显示了流域收入构成的多元化, 有利于生态经济系统的稳定。同时, 恩格尔系数减小, 表明人民生活水平日益提高。基于能值的流域生态经济系统投入产出效率动态研究结果表明在调整后的土地利用格局及种植结构下, 净能值产出率由1990年的2.5增长到2003年的3.41, 资源利用效率逐年提高, 环境负荷率在1990、1995和2003年分别为2.55、2.44和2.11, 呈减小趋势, 能值持续性指数从1990年的0.98增加到2003年的1.62, 经济与生态环境的协调性不断提高。研究结果表明该治理模式是成功的。

关键词 [生态经济系统](#); [生态经济结构](#); [能值](#); [小流域](#)

分类号 [Q146.148](#)

Analysis on small watershed eco-economic system in Loess Hilly Area: A case studies in Litaiping Small Watershed of Longde County

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Abstract Ecological degeneration on the Loess Plateau generally resulted from unreasonable land use and economic activities. To study economic process related to ecological degeneration, to restore the degenerated ecosystem are important issues for sustainable development of eco-economy on the Loess Plateau, and the loess hilly area is the key area to be cared on ecological restoration. Integrated small watershed management, as one of main action of ecological restoration, was used widely in this region and many achievements were made. In this study, Litaiping Small Watershed in Longde County was used as case study area, the eco-economic system structure and its dynamic during the restoration process were analyzed from eco-economic perspective, and the interactional approach and manner between economic and ecological in the system was explored. Based on emergy theory, an analysis on the dynamic variety of the transfer efficiency of energy flow and matter flow was also conducted to evaluate the eco-economic effect of the watershed management. The results showed that the pattern of cropland, woodland and pasture was improved from 6.2: 2.0: 1.0 in 1990 to 1.9: 1.4: 1.0 in 2003, and the land use structure and planting pattern became rational. The proportion of agricultural production in gross production value was decreased from 79.6% in 1990 to 54.8% in 2003, and the proportions of forest and animal husbandry as well as sideline were improved from 9.6%, 9.6% and 1.1% in 1990, to 22.7%, 15.1% and 7.4% in 2003, respectively. The diversity index of the farmer's income tended to increase

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se while a decrease was found in Engel's coefficient which indicated that the farmer's living standard was improved. Upon the result of emergy-based analysis, it was found that such land use change could increase net emergy yield ratio (ENYR) from 2.5 in 1990 to 3.41 in 2003. This means that the efficiency of resources utilization was improved. However, a decrease was observed on environment loading ratio(ELR) which was 2.55, 2.44 and 2.11 respectively in 1990, 1995 and 2003, and emergy-based sustainability index(ESI) was increased from 0.98 in 1990 to 1.62 in 2003. The results in this study indicated that harmony between economy and ecology in the study area was improved and the model of Litaiping small watershed management was successful.

Key words eco-economic system _ eco-economic structure _ emergy _ small watershed

DOI

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