

The strategies of local farmers' water management and the eco-hydrological effects of irrigation-drainage engineering systems in world heritage of Honghe Hani Rice Terraces

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Abstract: Terraces are built in mountainous regions to provide larger area for cultivation, in which the hydrological and geomorphological processes are impacted by local farmers' water management strategies and are modified by manmade irrigation-drainage engineering systems. The Honghe Hani Rice Terraces is a 1300a history of traditional agricultural landscape that was inscribed in the 2013 World Heritage List. The local farmers had developed systematic water management strategies and built perfect irrigation-drainage engineering systems to adapt the local rainfall pattern and rice farming activities. Through field investigation, interviews, combined with Geographic Information Systems, Remote Sensing images and Global Positioning Systems technology, the water management strategies as well as the irrigation-drainage systems and their impacts on eco-hydrological process were studied, the results indicate: Firstly, the local people created and maintained an unique woodcarving allocating management system of irrigating water over hundreds years, which aids distributing water and natural nutrition to each terrace field evenly, and regularly according to cultivation schedule. Secondly, the management of local people play an essential role in effective irrigation-drainage engineering system. A ditch leader takes charge of managing the ditch of their village, keeping ample amount of irrigation water, repairing broken parts of ditches, dealing with unfair water using issues, and so on. Meanwhile, some traditional leaders of minority also take part in. Thus, this traditional way of irrigation-drainage engineering has bringed Hani people around 1300 years of rice harvest for its eco-hydrological effects. Lastly we discuss the future of Honghe Hani Rice Terraces, the traditional cultivation pattern has been influenced by the rapid development of modern civilization, in which some related changes such as the new equipment of county roads and plastic channels and the water overusing by tourism are not totally rely on eco-hydrological engineering rules, which broke the ecosystem stability of agricultural terraces. The current situation of Honghe Hani Rice Terraces heritage cannot completely meets the purpose of sustainability development and appropriate conservation of Honghe Hani Rice Terraces heritage. This study of traditional cultivation pattern can help us to propose rational solutions for future development of terraces heritages.

Key words: Honghe Hani Rice Terraces, water management, eco-hydrological effects, heritage conservation