The Application of Quantitative Assessment of Land Use Changes Impact on Water Conservation for Reservoir Watershed

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Abstract. The recent increased pressure on slope land development in Taiwan has changed the land use pattern in many reservoir watershed areas and affected the hydrologic cycle. There were many local researches examined this related issue, but none of that can fully describe the relationship between water conservation capacity and land use patterns in watershed area.

This study is to integrate and analyze the impact to water conservation from deforestation or other land use pattern changes. In this study, an integrated methodology combining Geographic Information Systems (GIS), Remote Sensing (RS), Global Positioning System (GPS), and hydrologic simulation program (HSPF) is utilized to define the factor-consequence relationship of this issue from digital database, satellite images, land use pattern identification, and hydrology model, in respectively. The first part of this research was to determine those factors influenced the hydrological processes, which includes water balance parameters extraction for various input data in hydrological model. Secondly, an environmentally sound database was built using GIS, RS and GPS technologies. Then HSPF hydrologic model was used to estimate the quantity of water conservation capacity. The last part was to link the database with water conservation model and estimate the changes due to land use development. This research also use ArcView Avenue Script and C++ to establish an user interface, that provides users to input data and output the results. It can get the volume change of water conservation capacity caused by land use change real time. It provides watershed manager the reference in reservoirs watershed area conservation and development policy.

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