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On the Effectiveness of Land Management Decisions in Restoration of Hydrologic Ecosystem Services in Humid and Seasonal-Tropical Catchments

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Cities in the humid- and seasonal-humid tropics depend on small watersheds for their water supplies. Under normal conditions with ample rainfall, water supplies are reliable. However, water shortages can occur during extended dry periods. The literature contains contradictory findings regarding the effectiveness of different land management strategies aimed at enhanced delivery of hydrologic ecosystem services during periods of significant rainfall deficit, so-called “green infrastructure”. Recent research results from field and modeling studies in the Panama Canal Watershed indicated that land-cover dependent flow paths play an important role in partitioning throughfall into subsurface stormflow and groundwater recharge. Land management practices considered included continuous and rotational grazing, silvipastoral treatments, and different ages of secondary succession including old regrowth forest. The effectiveness of land management was found to depend on both land use practice and annual rainfall as determined by orography in steep regions. These dependencies at least partially explain some of the discrepancies in the literature.