

## Evaluation of Green Infrastructure with Different Woody Plants Practice and Benefit Using the Stormwater Management-HYDRUS Model

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**Abstract :** Green infrastructures (GIs) for rainwater management can directly meet the multiple purposes of urban greening and non-point source pollution control. To reveal the overall layout law of GIs dominated by typical woody plants and their impact on urban environmental effects, we constructed a HYDRUS-1D and Stormwater management (SWMM) coupling model to simulate the response of typical root woody plant planting methods on urban hydrological. The results showed that the coupling model had high adaptability to the simulation of urban surface runoff control effect under different woody plant planting methods ( $NSE \geq 0.64$  and  $R^2 \geq 0.71$ ). The regulation effect on surface runoff showed that the average runoff reduction rate of GIs increased from 60 % to 71 % with the increase of planting area (5% to 25%) under the design rainfall event of the 2-year recurrence interval. *Sophora japonica* with tap roots was slightly higher than that of without plants (control) and *Malus baccata* (*M. baccata*) with fibrous roots. The comprehensive benefit evaluation system of rainwater utilization technology was constructed by using an analytic hierarchy process. The coupling model was used to evaluate the comprehensive benefits of woody plants with different planting areas in the study area in terms of environment, economy, and society. The comprehensive benefit value of planting 15% *M. baccata* was the highest, which was the first choice for the planting of woody plants in the study area. This study can provide a scientific basis for the decision-making of green facility layouts of woody plants.

**Keywords :** green infrastructure, comprehensive benefits, runoff regulation, woody plant layout, coupling model

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