

## **Effects of land preparation and artificial vegetation on soil moisture variation in a loess hilly catchment of China**

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In the dryland regions, soil moisture is the main factor to determine vegetation growth and ecosystem restoration. Land preparation and vegetation restoration are the principal means for improving soil water content (SWC). Thus, it is important to analyze the coupling role of these two means on soil moisture. In this study, soil moisture was monitored at a semi-arid loess hilly catchment of China, during the growing season of 2014 and 2015. Four different land preparation methods (level ditches, fish-scale pits, adverse grade tablelands and level benches) and vegetation types (*Prunus armeniaca*, *Platycladus orientalis*, *Platycladus orientalis* and *Caragana microphylla*) were included in the experimental design. Our results showed that: (1) Soil moisture content differed across land preparation types, which is higher for fish-scale pits and decreased in the order of level ditches and adverse grade tablelands. (2) Rainwater harvesting capacity of fish-scale pits is greater than adverse grade tablelands. However, the water holding capacity is much higher at soils prepared with the adverse grade tablelands method than the ones prepared by fish-scale pits methods. (3) When land preparation method is similar, vegetation plays a key role in soil moisture variation. For example, the mean soil moisture under a *Platycladus orientalis* field is 26.72% higher than a *Pinus tabulaeformis* field, with the same land preparation methods. (4) Soil moisture in deeper soil layers is more affected by changes in the vegetation cover while soil moisture in the shallower layers is more affected by the variation in the land preparation methods. Therefore, we suggest that vegetation types such as *Platycladus orientalis* as well as soil preparation methods such as level ditch and fish-scale pit are the most appropriate vegetation cover and land preparation methods for landscape restoration in semi-arid loess hilly area. This conclusion was made based on the vegetation type and land preparation with the best water-holding capacity.