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### Soil and Water Research

A comparison between natural forests and reforested lands in terms of runoff generation potential and hydrologic response (case study: Kasilian Watershed)

Gholzom E.H., Gholami V.:

Soil & Water Res., 7 (2012): 166-173

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Afforested lands are different from natural forests in terms of hydrologic conditions, runoff generation potential, and sediment generation rate. These differences emerge due to changes in soil structure and vegetation density, litter amount, trees heights, and so on. In this study, a comparison has been made between natural forests and afforested lands in Kasilian – a watershed located in Mazandaran province, Northern Iran. To achieve this purpose, harmonious units have been defined by overlay analysis of these layers in GIS environment: slope, aspect, Digital Elevation Model (DEM) and soil. Then, the location of couple plots was defined by field studies in the harmonious units. The plot locations were selected in a way that runoff generation was a function of tree species and tree conditions, assuming that rainfall intensity is equal in all areas. Initial loss and runoff volume were measured in even plots after rainfall. Then, the initial loss parameter in a rainfall-runoff model was applied to compare runoff volume and peak discharge in the afforested lands and

natural forests. The rainfall-runoff model was presented using GIS and HEC-HMS model. The results showed that reforested lands have lower infiltration, lower initial loss, and higher runoff due to lower density, canopy, litter, and soil compaction. Furthermore, the runoff generation potential of reforested lands is several times higher than that of natural forests.

### **Keywords:**

couple plot; HEC-HMS; Kasilian watershed; natural forest; reforested lands; runoff

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