

Vegetation Restoration in the Wind-Water Crisscross Region of the Loess Plateau

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The most severe soil erosion in the Loess Plateau exists in the wind-water erosion crisscross region where the annual precipitation is about 400mm. In spring the wind erosion is very serious and in the summer and autumn the storm erosion is very frequent, so it is the typical fragile ecologic environment region. It is necessary to establish a land-use system that guarantees the water cycle in the river basin to prevent soil erosion and utilize land resources continuously.

The grass vegetation has a good function for soil and water conservation when the farmland was changed to grassland in the region on the Plateau. But the soil desiccation occurred since grass can consume more soil water than crops in this area. The soil moisture increased when farmland was changed to bare land; moreover, terrace has a better soil moisture condition than slope land. Soil water infiltration influenced by soil water content since the infiltration depth of terrace and bare land is deeper than that of grassland. The alfalfa can consume more soil water and its consuming depth is deeper than 4 m when it planted about 15 years in studied area and the soil profile became dry. Yield of alfalfa decreased because of soil desiccation. The soil moisture of artificial grassland recovered gradually after the alfalfa was cut. The recovered depth and extent in continuous alfalfa was less than that of bare land under climate condition of this year. A good agreement obtained between measured the water storage changes and estimated by a simple soil dynamic model. The model also can simulate soil moisture increase in future and the estimated results showed that rainfall distribution influence the soil dynamics significantly in the arid conditions rather than amount of rainfall increase or decrease a little.

More field experiments have being conducted in the Shenmu station to study the water cycles in SVAT in recent years. Lysimeter, Sap flow and others were used to determine the evapotranspiration of typical plants in this region which can contribute to vegetation restoration.