

**Effects of Rainfall and Soil Surface Management on Soil Water
Budget and Erosion in Arid Areas At Humrat El-Sahen Area - Salt**

By

Ala'a El-Kharabsheh

Supervisor

Prof. Ahmad Abu-Awwad

Co- Supervisor

Dr. Atef Al-Kharabsheh

ABSTRACT

Water harvesting is considered one of the most important techniques to collect and store rainfall. Soil water content and erosion as effected by soil surface management play an important role in this matter. Field experiments were conducted at Humrat El-Sahen (Princess Tasneem Bent Gazi for Technical Research Station) at the western part of Salt City to determine soil moisture storage and erosion under different soil surface management. Randomized Complete Block Design(RCBD) was used with four replicates. Statistical analysis included the analysis of variance and comparison between means using Duncan's Multiple Range Test at 5 % probability level carried out to test differences between the different treatments.

Three experiments were carried out:

Experiment (A) which aimed to study soil moisture storage, runoff and sediment height with different soil surface management. Four treatments were used as folloing: furrows

with 6 m catchment area per furrow (F6); a group of two furrows 6 m apart between group of furrows and 1 m between the 2 furrows (F2); furrows with 3 m catchment area per furrow (F3); and natural treatment (N).

Experiment (B) aimed to study the effect of furrowing on sediments height. In each treatment many metal pegs were installed in each plot to estimate the height of sediment after each rainfall storm. Experiment (C) aimed to study the effect of plowing on soil erosion in two locations with two different slopes; 7 % and 3 % for site 1 and 2, respectively.

The thickness of the upper soil layer were monitored before and after each rainfall storm to estimate the thickness of soil layer which was removed by rainfall. This was achieved by installing many metal pegs at each plot. In addition, different stones were painted to estimate the distance of transporting.

Results indicated that F3 treatment was the most efficient treatment in increasing water storage as compared with the other treatments, with the lowest runoff among all other treatments, also the lowest sediment height. Using such practices were effective in decreasing sedimentation and erosion from soil surface.

Experiment (C) shows that counter plowing of the soil surface was more effective in reducing soil erosion.