

RESTORING DEGRADED RANGELANDS IN JORDAN: OPTIMIZING MECHANIZED MICRO WATER  
HARVESTING TECHNIQUE USING RANGELAND HYDROLOGY AND EROSION MODEL (RHEM)

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Jordan's rangelands, the so called Badia, home of the Bedouins, are threatened through a combination of over-exploitation of the ecosystem services and a changing climate towards drier seasons and highly erratic rainfalls. In the recent decades, the once productive grazing lands transformed into sparsely vegetated and crusted desert grounds not capable of retaining the sporadic rainwater within the landscape - and consequential surface runoff inevitably accelerates soil erosion and gullyng. To counter-measure the imminent rangeland degradation the International Center for Agricultural Research in the Dry Areas (ICARDA) is investigating mechanized micro Water Harvesting (WH) based restoration technique using the Vallerani plow. This technique intermediately breaks up the crusted surface soil layers and hard pans to approximately 50cm depth. Thus, creating dispersed micro-catchments, well-protected and suitable for the plantation of shrub seedlings, supporting the initial vegetation growth and eventually leading to shrub-island evolvement over the landscape. However, optimum design, particularly the spacing between the WH plow lines, depend on various environmental conditions. In this research, Rangeland Hydrology and Erosion Model (RHEM) was used to assess degraded rangeland hydrological response to transparently suggest on WH layout optimized for the magnitudes and the occurrence probabilities of runoff, soil erosion and sediment accumulation affecting the storage capacity of the micro-catchments. The study combined physical based modeling and ground truthing through different runoff and sediment related experiments. Preliminary results demonstrate good potential of the RHEM-based WH design approach; case study results will be presented for the first time at the conference. Eventually, a fully developed rangeland assessment system will support transparent target area selection and sound WH design interlinked with a risk analysis approach that accounts for the variable environmental patterns of the Badia.