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Evaluation of the effects of rainwater harvesting techniques on soil moisture balance in semi-arid climatic conditions

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ABSTRACT

Water harvesting Knowledge has an ancient history. From old times, people, specially, occupants of arid lands whose access to water was limited, invent different ways to collect and conserve water. Today, many of these methods are reclaimed and introduced as Indigenous Knowledge. There are many case studies in different branches of water harvesting and new methods based on Indigenous Knowledge have been presented. These studies especially in our country, which is situated in the desert belt, are of importance. This study is based and inspired by one of these methods. Given that Mashhad city is situated in a semi-arid zone in Khorasan Razavi, therefore, is in a good situation for this study. Accordingly, an area was chosen which is situated in a 4.2 % slope and a 22 % slope of overlooking hillsides of Mayan-Payeen, Dehbar district, south of Mashhad. Basic meteorology data were collected and essential soil data were calculated in soil lab. Inspired by Martinez et al. field study, their designated software model, Modipe, was used in choosing the best structures for the area. Negarim microcatchment and absorbing banquet was chosen for both of slopes. During six months, after each precipitation, soil sampling was done with six time repeating process. Soil moisture was calculated after each time. Using basic data and soil information, Changing Procedure of soil moisture was studied. Graph analysis showed that in total both structures performance were 20 % better than testifiers. And at the end of precipitation period, loosing moisture in testifiers is two times more than the structures, an average of 30 %. The acquired results confirms the success of Modipe's suggested structures.

Key words: Water harvesting; arid lands; indigenous knowledge; Modipe model; Negarim Micro-catchment; absorbing banquet; soil moisture process analysis.

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